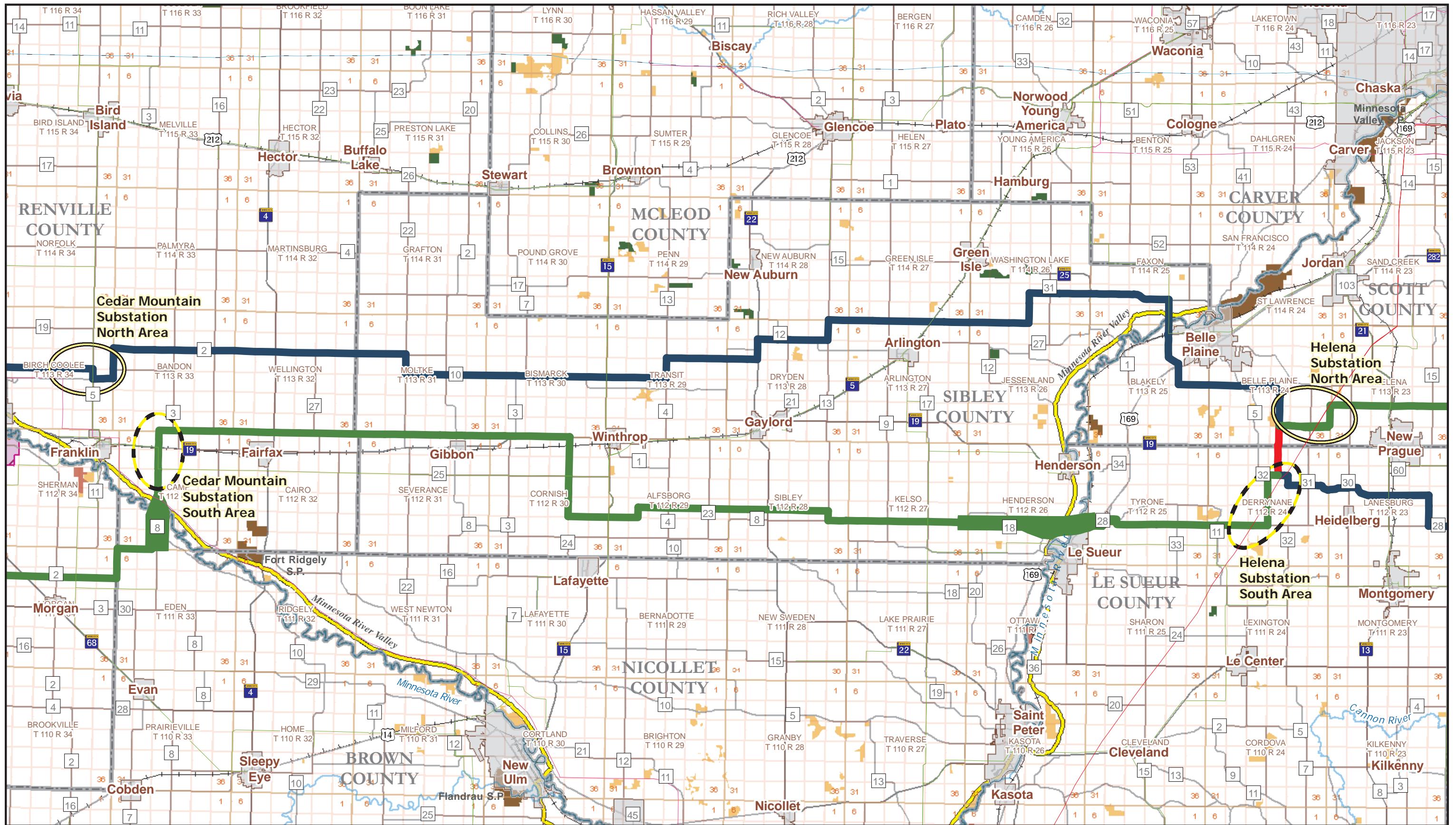


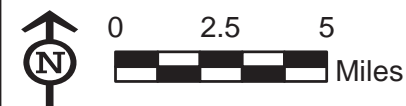
# **Attachment A**

Map of Preferred and Alternate Helena Substations

CapX 2020 Brookings Route Application



**CapX2020**  
Delivering electricity you can rely on



- Project Substations
- Preferred Substation Area
- Alternate Substation Area
- City
- Scenic Byway

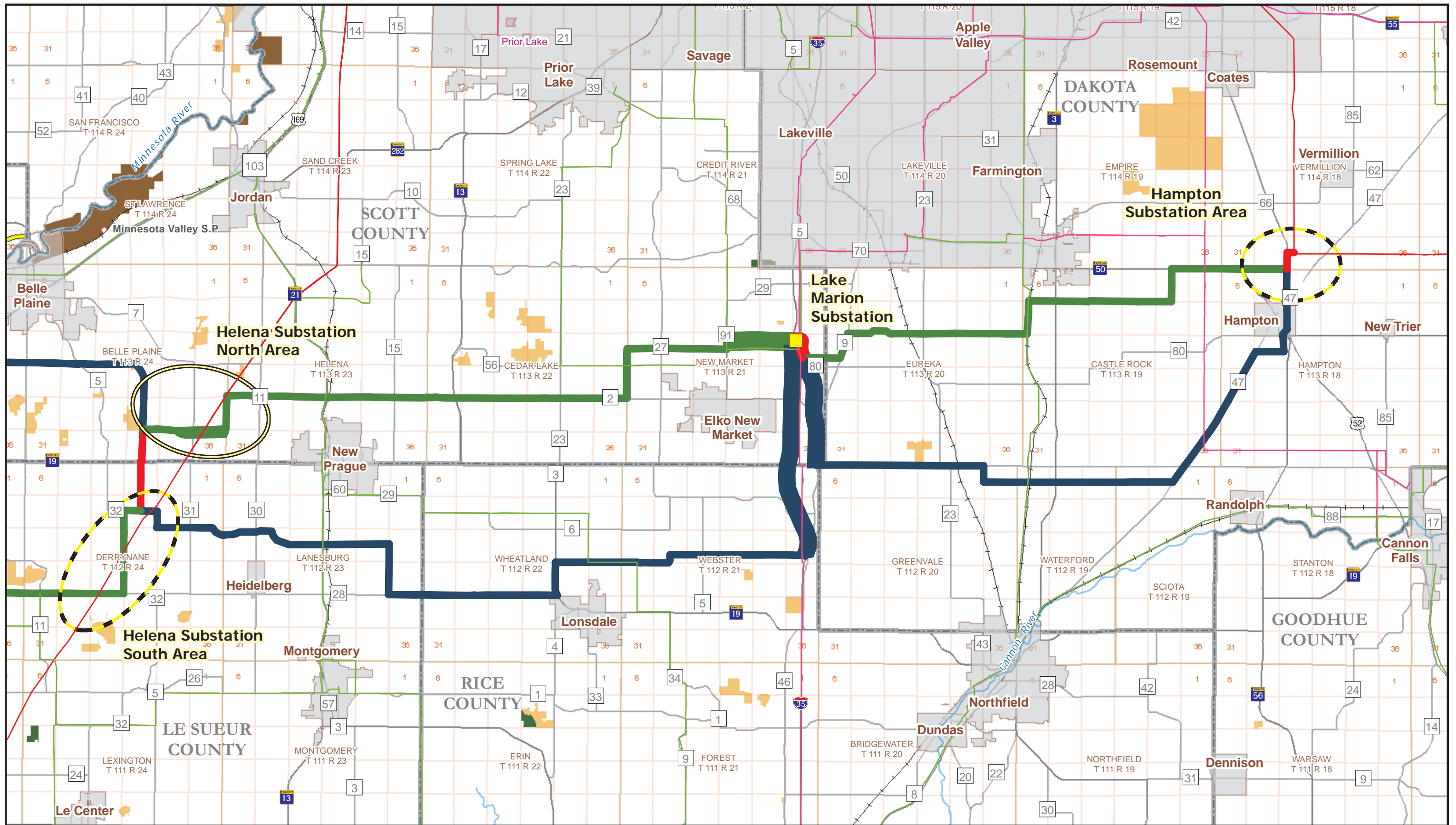
- Transmission Lines**
- 69 kV - Existing
  - 115 kV - Existing
  - 230 kV - Existing
  - 345 kV - Existing

- Routes**
- Preferred
  - Alternate
  - Both Preferred & Alternate

- Tribal Lands
- MN SNA
- MN State Park
- MN WMA
- USFWS WPA

Appendix A.5 - Overview Map  
Cedar Mountain Substation Area to Helena Substation Area

Route Permit  
Brookings County - Hampton  
345 kV Transmission Line



**CapX2020**

Delivering electricity you can rely on



- Project Substations
- Preferred Substation Area
- Alternate Substation Area
- City
- Scenic Byway

- Transmission Lines**
- 69 kV - Existing
  - 115 kV - Existing
  - 230 kV - Existing
  - 345 kV - Existing

- Routes**
- Preferred
  - Alternate
  - Both Preferred & Alternate

- Tribal Lands
- MN SNA
- MN State Park
- MN WMA
- USFWS WPA

Appendix A.6 - Overview Map  
Helena Substation Area to Hampton Substation Area

Route Permit  
Brookings County - Hampton  
345 kV Transmission Line

# **Attachment B**

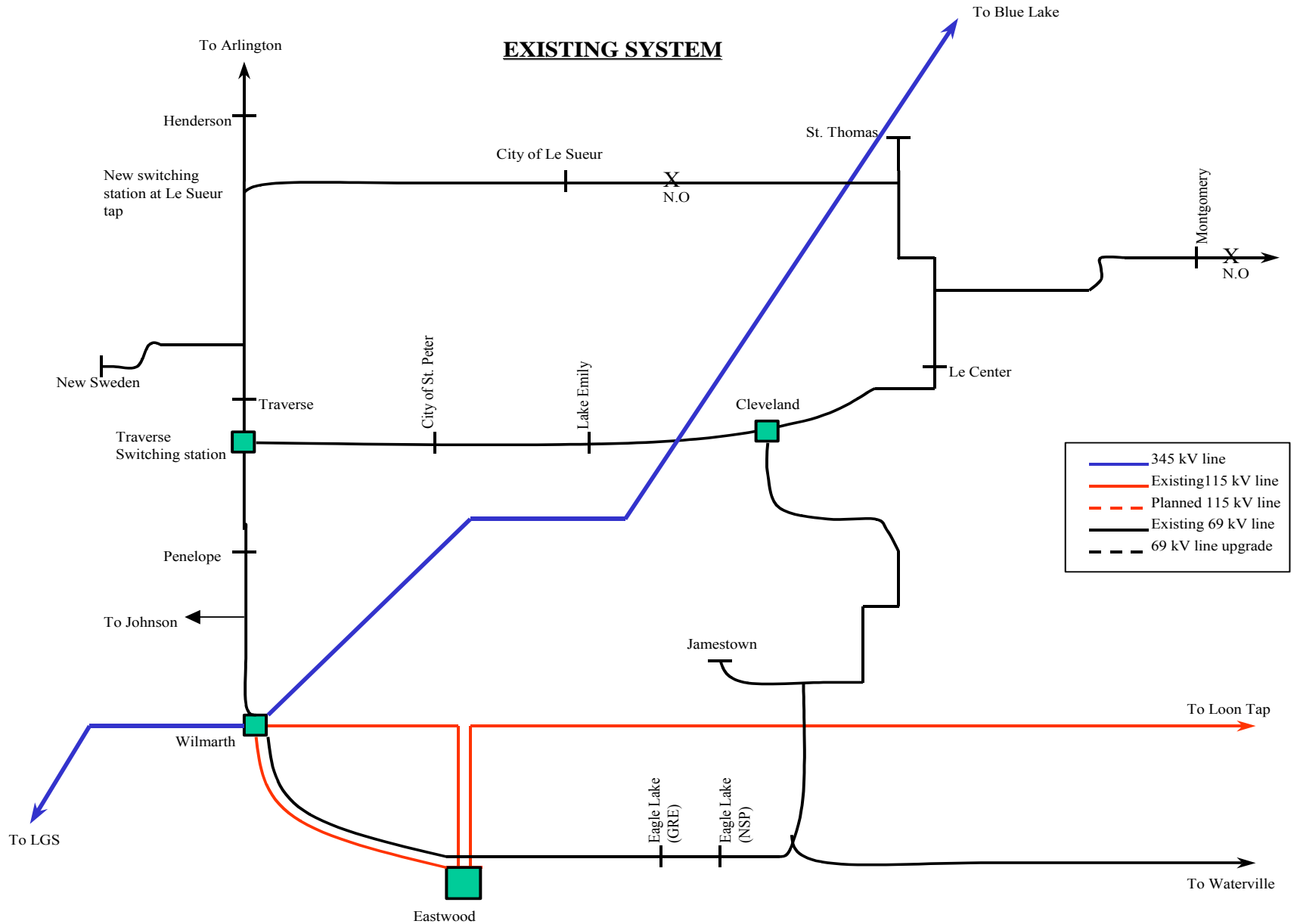
North Mankato Load Serving Study - powerpoint

7/24/2008 NMSPG Meeting (?)

# North Mankato Load Serving study

Xcel Energy  
Great River Energy

# Study Area:



# System Characteristics

- Major loads include Cities of Lesure and St. Peter
- Only two strong sources from Wilmarth.
- Long 69 kV lines.

## Critical contingencies (2012):

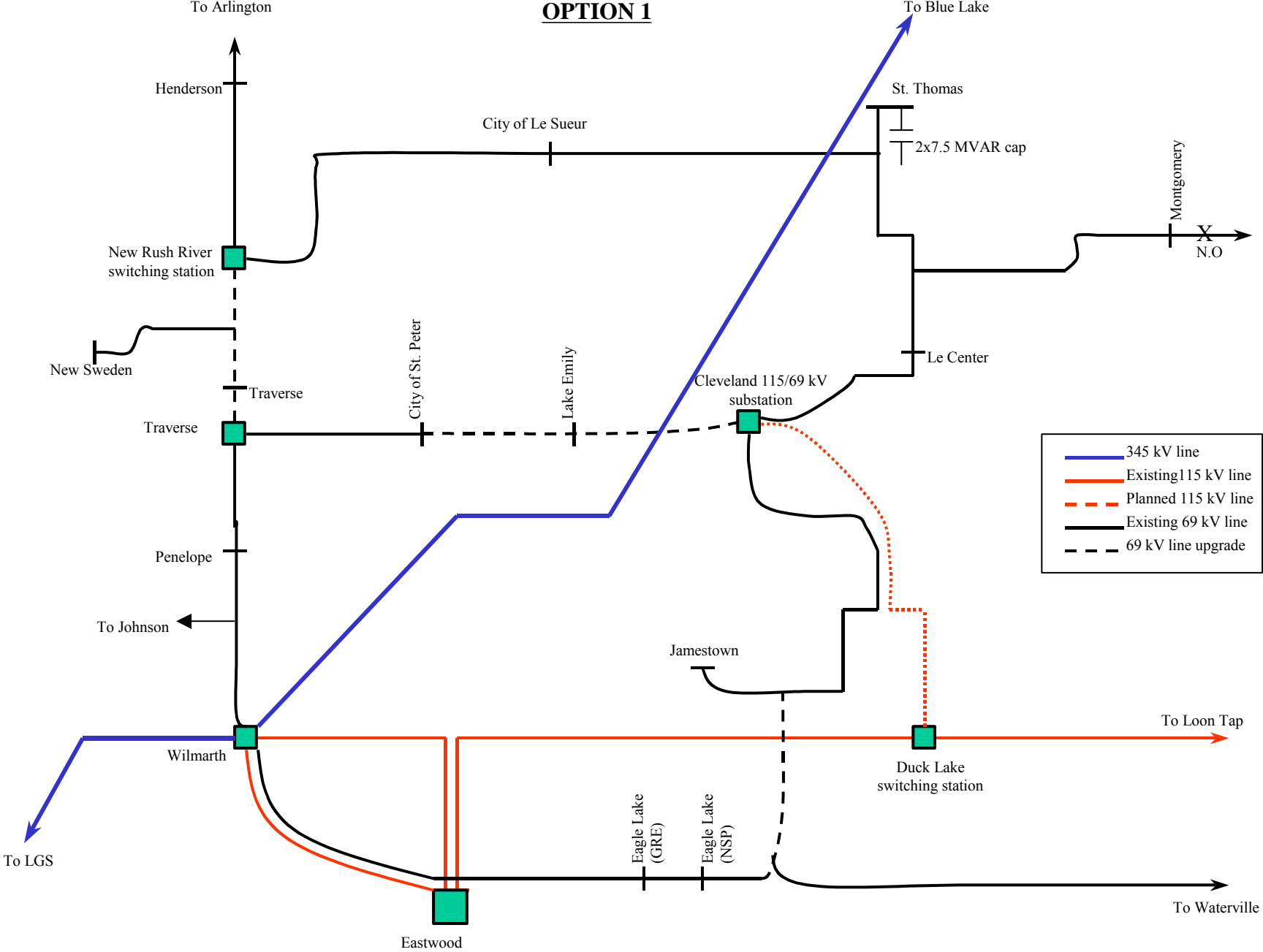
<b>Contingency</b>	<b>Branch Overload</b>	<b>Overload</b>	<b>Bus</b>	<b>Voltage</b>
Wilmarth – Penelope	Cleveland – Jamestown tap	145 %	Eagle Lake - Cleveland – St. Thomas	91.5 %
Wilmarth – Eagle Lake	Wilmarth – Traverse	109 %	Cleveland – St. Thomas	88 %
Traverse – St. Peter	Jamestown – Cleveland	130 %	St. Peter – Cleveland – St. Thomas	86.5 %



## Critical contingencies continued:

<b>Contingency</b>	<b>Branch Overload</b>	<b>Overload</b>	<b>Bus</b>	<b>Voltage</b>
Le Sueur – Le Sueur Tap	Cleveland – Le Center	102 %	Le Sueur – Montgomery	88.6 %
Loss of Cleveland – Le Center	Traverse – New Sweden	104 %	Le Center – St. Thomas	90.8 %

**OPTION 1**



	345 kV line
	Existing 115 kV line
	Planned 115 kV line
	Existing 69 kV line
	69 kV line upgrade



# Preferred Plan:

- Preferred Plan is option 2.
- Relatively inexpensive.
- Scope for future 115 kV line additions from Helena substation.

## Other Concerns:

- SPS to trip the Helena – St. Thomas line for the loss of Helena – Wilmarth or Helena – Blue Lake 345 kV lines.
- The inservice date for this project depends on the inservice date of Helena 345 kV substation. The project schedules has to be coordinated with the Southwest Minnesota – Twin cities 345 kV line.

Questions?

# Attachment C

MTEP 2009 (selected)

Table 7.1-1: MTEP 09 New Appendix A Projects

Region	Geographic Location by TO Member System	ID	Project Name	Project Description	State	Allocation Type per FF	Share Status	Estimated Cost	Expected ISD	Plan Status	App ABC	Midwest ISO Facility
West	XEL	2156	North Mankato 115 kV project	1) New 345/115 kV TR at the proposed Helena 345 kV switching station. 2) New 115 kV line from Helena-St. Thomas. 3) New 115/69 kV substation near St. Thomas. 4) New 69 kV switching station at Lesueur Tap.	MN	Other	Not Shared	\$17,450,000	6/1/2011	Planned	B>A	Y
West	XEL	2157	Douglas Co 2nd TR	2nd Douglas Co 115/69 kV transformer	MN	Other	Not Shared	\$4,435,000	6/1/2011	Planned	B>A	NT
West	XEL	2158	Upgrade Sauk Center-Osakis 69 kV line	Upgrade Sauk Center-Osakis 69 kV line to a lower impedance.	MN	Other	Not Shared	\$4,514,000	6/1/2011	Planned	B>A	NT
West	XEL	2308	Grove Lake-Glenwood line rebuild	This project is to rebuild 13 miles of 69 kV line from Grove Lake switching station to Glenwood to 477 ACSR	MN	Other	Not Shared	\$16,350,812	6/1/2011	Proposed	B>A	NT
West	XEL	1952	Plato capacitor bank	This project is to add a 10 MVAR cap bank at Plato. This project is required to convert the existing 69 kV line from Young America-Glencoe to 115 kV (part of Glencoe-West Waconia 115 kV line project).	MN	Other	Not Shared	\$700,000	12/1/2011	Planned	B>A	NT
West	XEL	2160	Park Falls TR upgrade	Upgrade the Park Falls 115/34.5 kV TR to 47 MVA	WI	Other	Not Shared	\$3,355,800	6/1/2012	Planned	B>A	NT
West	XEL	2176	Cannon Falls transmission improvements	(1) Change breaker configuration at Coville Substation (2) Add 115 kV Ring bus at Cannon Falls (3) Install new 115/69 kV transformer at Coville substation (4) New 2 mile 69 kV line from Cannon Falls to Bylesby.	MN	Other	Not Shared	\$6,235,000	6/1/2012	Proposed	B>A	Y
West	XEL	2309	Maple Lake-Walkins line rebuild	This project is to rebuild 20 miles of 69 kV line from Maple Lake to Walkins in west Central Minnesota	MN	Other	Not Shared	\$2,487,000	6/1/2012	Proposed	B>A	NT



Appendix A: Facility Table 10/16/2009

Appendix A: Approved Projects

Target	Region	Geographic Location by TO	Facility ID	Expected (SD) From Sub	To Sub	Ckt	Max kV	Min kV	Summer Rate	Upgrade Description	State	Miles Urg	Miles New	Plan Status	Estimated Cost	Cost Shared	Postage Stamp	MISO Facility	App ABC
A in MTEP09 West	Central	Ameren	1240	6/1/2012	Huster	1	138	370	361 MVA	Reconductor 15 miles	MO	15	4	Proposed	\$6,483,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2307	6/1/2012	Mayhew Lake	1	115	361 MVA	361 MVA	Convert double circuit 115 kV line from Benton Co to St. Cloud tap to bifurcated single circuit, build additional 4 miles of 115 kV line from St. Cloud tap to Mayhew Lake substation.	MN			Proposed	\$3,000,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2307	6/1/2012	Granite City	1	115	194 MVA	194 MVA	Convert 1 mile of double circuit from St. Cloud tap to Granite City to bifurcated single circuit.	MN			Proposed	\$100,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2307	6/1/2012	W St. Cloud	1	115	361 MVA	361 MVA	Upgrade line to 361 MVA	MN	1.4		Proposed	\$1,000,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2307	6/1/2012	Breakers	1	115	100 MVA	100 MVA	Upgrade to 115 kV ring bus	MN			Proposed	\$2,000,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2308	6/1/2011	Sedan	1	69	100 MVA	100 MVA	Upgrade to 477 ACSR	MN	5.3		Proposed	\$2,280,284	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2308	6/1/2011	Glenwood (GRE)	1	69	100 MVA	100 MVA	Upgrade to 477 ACSR	MN	5		Proposed	\$2,132,344	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2308	6/1/2011	Lomby tap	1	69	100 MVA	100 MVA	Upgrade to 477 ACSR	MN	2.8		Proposed	\$11,941,126	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2308	6/1/2011	Glenwood (KCEL)	1	69	100 MVA	100 MVA	Upgrade to 477 ACSR	MN	0.04		Proposed	\$17,058	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2309	6/1/2012	Annandale	1	69	100 MVA	100 MVA	Upgrade to 477 ACSR	MN	6		Proposed	\$2,487,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2765	12/1/2008	Ulk wind farm	1	34.5	13.8		New 4.5 MW wind interconnection	MN			Planned	\$118,100	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2772	10/1/2010	Distribution Substation	1	115	360		New distribution substation Between Elliot Park and Southtown	MN			Planned	\$14,270,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2772	10/1/2010	Midtown	1	115	13.8		Double Circuit 1.25 Mile line	MN		1.25	Proposed	\$1,500,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2772	10/1/2008	Midtown Transformer	2	115	360		New distribution substation	MN			Proposed	\$11,120,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2156	6/1/2011	Helena	1	345	115,448		Double Circuit 1.25 Mile line	MN		1.25	Proposed	\$1,500,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2156	6/1/2011	Helena	1	115	115,318		New 345/115 kV transformer at Helena substation	MN			Planned	\$7,250,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2156	6/1/2011	Helena	1	115	69,112		New 6 mile 115 kV line	MN		6	Planned	\$2,750,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	2156	6/1/2011	St. Thomas	1	69	69,112		New 115/69 kV substation	MN			Planned	\$5,000,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	1235	6/1/2012	Federicktown	1	161	250		69 kV switching station at LeSueur	MN			Planned	\$2,450,000	Y	Y	B-A	B-A
A in MTEP09 West	Central	Ameren	1235	6/1/2012	Federicktown	1	161	250		Increase ground clearance	MN	12		Proposed	\$970,500	Y	Y	B-A	B-A
A in MTEP09 Central	Ameren	Ameren	1238	6/1/2011	GM-Point Prairie 161 kV AECI Eron Substation	1	161	280		Extend 1 mile of line to AECI Eron Substation	MO		1	Planned	\$1,278,700	Y	Y	A	A
A in MTEP07 Central	Ameren	Ameren	152	12/1/2010	Rockwood BOC Tap	1	138	339		Reconductor one span of Roxford - BOC 138 kV line	MO	0.1	10	Planned	\$13,381,100	Y	Y	A	A
A in MTEP08 Central	Ameren	Ameren	2058	9/30/2009	Roxford	1	138	382		Build new 138 kV line from BOC Tap to Conoco Substation	IL			Planned	\$13,000,000	Y	Y	A	A
A in MTEP08 Central	Ameren	Ameren	2058	9/30/2009	BOC Tap	1	138	382		Build new 138 kV line from BOC Tap to Conoco Substation	IL			Planned	\$2,113,000	Y	Y	A	A
A in MTEP08 Central	Ameren	Ameren	2058	9/30/2009	BOC Tap	1	138	382		Increase Clearances to ground for 120 degrees C operation of 477 ACSR	IL	4.54		Planned	\$2,113,000	Y	Y	A	A
A in MTEP08 Central	Ameren	Ameren	2060	6/1/2010	East Peoria	1	138	159		Build 8.5 miles of 345 kV line and remove the Latham - Maroa W connection	IL	8.5		Planned	\$16,039,400	Y	Y	A	A
A in MTEP08 Central	Ameren	Ameren	2068	6/1/2012	Latham	1	345	1195		Build approximately 5 miles of 345 kV line from Brokaw - South Bloomington substation	IL	5		Planned	\$11,000,000	Y	Y	A	A
A in MTEP08 Central	Ameren	Ameren	2069	6/1/2012	Brokaw	1	345	1793		Build approximately 5 miles of 345 kV line from Brokaw - South Bloomington substation	IL			Planned	\$11,000,000	Y	Y	A	A
A in MTEP08 Central	Ameren	Ameren	2069	6/1/2012	South Bloomington	1	345	138,560		Install 560 MVA 345/138 kV transformer at South Bloomington substation	IL			Planned	\$6,600,000	Y	Y	A	A
A in MTEP08 Central	Ameren	Ameren	2071	11/1/2009	East Springfield	1	138	255		Cut East Springfield - Holland 138 kV line and make in - and - out connections	IL			Planned	\$553,000	Y	Y	A	A
A in MTEP08 Central	Ameren	Ameren	2071	11/1/2009	Interstate	1	138	255		Cut East Springfield - Holland 138 kV line and make in - and - out connections	IL			Planned	\$553,000	Y	Y	A	A
A in MTEP06 Central	Ameren	Ameren	1241	12/1/2009	Mattoon, West	1	138	289		Install 138 kV Breaker at 1 Mattoon, West	IL			Planned	\$1,010,000	Y	Y	A	A
A in MTEP06 Central	Ameren	Ameren	1241	12/1/2009	Mattoon, West	1	138	289		Install 138 kV Breaker to connect Wind Farm	IL			Planned	\$1,010,000	Y	Y	A	A
A in MTEP08 Central	Ameren	Ameren	1532	6/1/2011	Stallings	1	138	280		Reconductor to 2000 A Summer Emergency, Increase ground clearance	IL	4.9		Planned	\$2,566,900	Y	Y	A	A
A in MTEP08 Central	Ameren	Ameren	1532	6/1/2011	Stallings	1	138	280		Replace terminal equipment at Stallings, Increase ground clearance	IL	4.9		Planned	\$744,800	Y	Y	A	A

Appendix C: Project Table 10/16/2009		Project Summary Information from Facility Table															
Target Appendix	Region	Geographic Location by TO	ProjID	Project Name	Project Description	State	State?	Allocation Type per FF	Share Status	Other Type	Estimated Cost	Expected (USD)	Plan Status	Max KV	Min KV	App ABC	MISO Facility
C	West	GRE	2650	Bunker Lake-Andover Tap (PEX portion) Reconductor to ACSS	Bunker Lake-Andover Tap (PEX portion) Reconductor to MN ACSS	MN					\$152,000	6/1/2013 Proposed	69		C		Y
C	West	GRE	2651	North Mankato Area Load Serving	LeSeuer Tap-St. Thomas	MN					\$1,351,500	6/1/2012 Proposed	69		C		Y
C	West	GRE	2652	Liberty Second Transformer	Liberty Second Transformer	MN					\$3,394,835	6/1/2013 Proposed	115	69	C		Y
C	West	GRE	2653	Soderville-East Bethel Rebuild	Soderville-East Bethel Rebuild	MN					\$1,075,000	6/1/2014 Proposed	69		C		Y
C	West	GRE	2654	St. Stephen	St. Stephen	MN					\$625,000	6/1/2015 Proposed	115		C		Y
C	West	GRE	2655	Le Homme Dieu 115 KV conversion	Le Homme Dieu 115 KV conversion	MN					\$364,000	6/1/2013 Proposed	115		C		Y
C	West	GRE	2656	Fergus Falls 115 KV project	Fergus Falls 115 KV project	MN					\$1,679,000	6/1/2014 Proposed	115		C		Y
C	West	GRE	2657	Alexandria - Albany (50.0 mi.) 115 KV lin	Alexandria - Albany (50.0 mi.) 115 KV lin	MN					\$24,103,500	6/1/2016 Proposed	115	69	C		Y
C	West	GRE	2658	Coon Creek Substation and Coon Creek-HWY 65	Coon Creek Substation and Coon Creek-HWY 65	MN					\$7,853,902	6/1/2015 Proposed	69		C		Y
C	West	GRE	2659	HWY 65 Rebuild double circuit	Rebuild double circuit	MN					\$960,000	6/1/2015 Proposed	115		C		Y
C	West	GRE	2660	Randolph (DEA) 115 KV Substation	Randolph (DEA) 115 KV Substation	MN					\$960,000	6/1/2015 Proposed	115		C		Y
C	West	GRE	2660	Perham 3.0 MVA/capacitor bank	Perham 3.0 MVA/capacitor bank	MN					\$960,000	6/1/2015 Proposed	115		C		Y
C	West	GRE	2661	New York Mills 3.6 MVA/capacitor bank	New York Mills 3.6 MVA/capacitor bank	MN					\$960,000	6/1/2015 Proposed	115		C		Y
C	West	GRE	2662	High Island Conversion to 115 KV	High Island Conversion to 115 KV	MN					\$4,530,000	6/1/2010 Proposed	115		C		Y
C	West	GRE	2663	Cleary Lake-Credit River 115 KV Rebuild	Cleary Lake-Credit River 115 KV Rebuild	MN					\$322,050	6/1/2013 Proposed	115		C		Y
C	West	GRE	2664	Mantrap and Potato Lake 115 KV Conversion	Mantrap and Potato Lake 115 KV Conversion	MN					\$2,738,750	11/1/2013 Proposed	115		C		Y
C	West	GRE	2665	Schroeder-Luvsen 115 KV Rebuild	Schroeder-Luvsen 115 KV Rebuild	MN					\$4,258,670	6/1/2015 Proposed	69		C		Y
C	West	GRE	2666	Carver County-Assumption to 115 KV	Carver County-Assumption to 115 KV	MN					\$1,983,900	6/1/2014 Proposed	115		C		Y
C	West	GRE	2667	Rush City-Adrian Robinson Rush City Dist Relamp	Rush City-Adrian Robinson Rush City Dist Relamp	MN					\$284,800	6/1/2014 Proposed	69		C		Y
C	West	GRE	2668	Oseage Regulator	Oseage Regulator	MN					\$2,039,835	6/1/2015 Proposed	115		C		Y
C	West	GRE	2669	Dickinson-West St. Cloud Transformer Replacement	Dickinson-West St. Cloud Transformer Replacement	MN					\$2,039,835	6/1/2011 Proposed	115	69	C		Y
C	West	GRE	2670	North Perham 115/41.6 Source	North Perham 115/41.6 Source	MN					\$4,235,028	6/1/2012 Proposed	115	41.6	C		Y
C	West	GRE	2672	Rush City - Bear Creek - Effie Transformer Swap	Rush City - Bear Creek - Effie Transformer Swap	MN					\$3,211,422	6/1/2011 Proposed	230	69	C		Y
C	West	GRE	2673	Dalbo-St. Francis (14 mi.) 69 KV line	Dalbo-St. Francis (14 mi.) 69 KV line	MN					\$6,165,000	6/1/2012 Proposed	69		C		Y
C	West	GRE	2674	Milaca-Long Siding (8.85 mi.) Rebuild	Milaca-Long Siding (8.85 mi.) Rebuild	MN					\$2,488,500	6/1/2011 Proposed	69		C		Y
C	West	GRE	2675	West St. Cloud Breaker for Sartell line	West St. Cloud Breaker for Sartell line	MN					\$1,942,000	6/1/2012 Proposed	115		C		Y
C	West	GRE	2676	Paynesville-Watkins 69 KV line	Paynesville-Watkins 69 KV line	MN					\$6,180,000	6/1/2012 Proposed	69		C		Y
C	West	GRE	2677	Princeton-Princeton Tap (5.12 mi.) Reconductor to ACSS	Princeton-Princeton Tap (5.12 mi.) Reconductor to ACSS	MN					\$409,600	6/1/2012 Proposed	69		C		Y
C	West	GRE	2678	Zimmerman 19.6 MVA/capacitor	Zimmerman 19.6 MVA/capacitor	MN					\$291,800	6/1/2012 Proposed	69		C		Y
C	West	GRE	2679	Ramsey-Grand Forks (81.02 mi.) 230 KV Rebuild	Ramsey-Grand Forks (81.02 mi.) 230 KV Rebuild	ND					\$38,484,500	11/1/2020 Proposed	230		C		Y
C	West	GRE	2680	Shamneau Lake-North Parker (13.6 Mile) Rebuild	Shamneau Lake-North Parker (13.6 Mile) 115 KV line	MN					\$5,734,800	6/1/2016 Proposed	115		C		Y
C	West	GRE	2681	St. Boni Second 115/69 KV Substation Improvements	St. Boni Second 115/69 KV Substation Improvements	MN					\$2,359,835	6/1/2014 Proposed	115	69	C		Y
C	West	GRE	2682	Lake Marion 140 MVA Transformer Replacement	Lake Marion 140 MVA Transformer Replacement	MN					\$1,939,835	6/1/2014 Proposed	115	69	C		Y
C	West	GRE	2683	Bloom 115 KV upgrade	Bloom Tap 115 KV line 3-way switch in Fenton-Hobbes 115 KV line #2	MN					\$1,289,000	6/1/2015 Proposed	115		C		Y
C	West	GRE	2684	Assumption-Belle Plaine to 115 KV	Assumption-Belle Plaine to 115 KV	MN					\$4,332,810	6/1/2016 Proposed	115		C		Y
C	West	GRE	2685	Lake Marion-Lake Marion Tap to 115 KV Double Circuit	Lake Marion-Lake Marion Tap to 115 KV Double Circuit	MN					\$1,297,620	6/1/2016 Proposed	115		C		Y
C	West	GRE	2686	Lake Marion Tap-Eiko-New Market to 115 KV	Lake Marion Tap-Eiko-New Market to 115 KV	MN					\$2,343,400	6/1/2016 Proposed	115		C		Y
C	West	GRE	2687	New Market-Helena 115 KV line	New Market-Helena 115 KV line, Helena 115 KV breaker and line termination, New Market 115/69 KV source	MN					\$10,215,028	6/1/2016 Proposed	115		C		Y
C	West	GRE	2688	Elk River West-Waco Rebuild	Elk River West-Waco Rebuild	MN					\$1,476,300	6/1/2015 Proposed	69		C		Y
C	West	GRE	2689	Breezy Point-Breezy Point Tap Relamp	Breezy Point-Breezy Point Tap Relamp	MN					\$180,000	11/1/2015 Proposed	69		C		Y


# **Attachment D**

GRE 2008 Long-Range Transmission Plan (selected)

# **GREAT RIVER ENERGY**



**GREAT RIVER**  
**ENERGY<sup>®</sup>**

A Touchstone Energy<sup>®</sup> Cooperative 

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## **LONG-RANGE TRANSMISSION PLAN**

**TRANSMISSION PLANNING DIVISION**

**OCTOBER, 2008**

## GRE Long-Range Transmission Plan

### J: Southeastern Minnesota Region

The Southeast Minnesota region encompasses the entire southeastern part of the GRE system with the exception of Dakota and Scott Counties, which are covered as a separate study region. Member system service territory in this area includes:

- BENCO Electric Cooperative, (BENCO)
- Goodhue County Cooperative Electric Association (Goodhue)
- Minnesota Valley Electric Cooperative (MVEC)
- Steele Waseca Cooperative Electric (SWCE)

The load consists of mostly farm and agricultural services, but BENCO also has some higher density residential and commercial & industrial load in North Mankato and around Mankato. Geographically, the region covers the area south and east of a line from Red Wing to Northfield to New Prague to Arlington to west of Mankato and east of Fairmont. It is bounded on the south and east by the Iowa border and a line from Albert Lea to Rochester to Lake City. Other utilities supplying load in this area include XCEL Energy (XEL), Alliant Energy, and Southern Minnesota Municipal Power Agency (SMMPA). Some of the connecting transmission is owned and operated by Dairyland Power Cooperative (DPC). Appendix VI-J contains the detail data for this region.

#### **BENCO**

BENCO Electric Cooperative's service area is located in south central Minnesota in prime farm country. The Minnesota River Valley cuts through the northern portion of the service area. The major city is Mankato, located in the north central portion of the service area. Around the Mankato area are emerging suburbs with several housing developments and mobile home parks.

The economy of the BENCO Electric Cooperative service area is primarily dependent upon agriculture. Most of the BENCO Electric Cooperative service is prime farmland producing predominantly soybeans and corn, with some wheat, oats, hay and vegetables. The economy of Mankato and North Mankato continues to grow when surrounding areas have little or no economic growth. Housing starts are at record levels with mortgage interest rates at very low levels.

#### **Goodhue**

The Cooperative's electric distribution service territory is located in the southeastern part of Minnesota, serving the rural areas in a large part of Goodhue County and small portions of Wabasha, Olmsted, Dodge, Dakota and Rice Counties. Growth is expected because of the location and convenient access to the Cooperative's area. A major four-lane highway between the Twin Cities and the City of Rochester angles through the center of the Cooperative, in addition to other highways and paved county roads throughout the area. The Cannon Falls area in the northwest part of the Cooperative is only about 35 miles southeast of Minneapolis and St. Paul, Rochester is about 15 miles south of the cooperative's service territory and the City of Red Wing is located just northeast of the area. The growth has been controlled by zoning regulations for the purpose of protecting farmland from development.

Goodhue County has started to allow some rural housing developments. As a result, the Cooperative is providing water and wastewater system operation and maintenance for some of these developments.

## **GRE Long-Range Transmission Plan**

Xcel Energy serves the larger towns and villages as well as a small amount of rural area within the Cooperative's general service area. The electrical distribution service territory boundaries have been established by the Minnesota Public Utilities Commission (MPUC). No significant service territory changes are expected during the period of this Long Range Load Forecast Plan.

The economy in the Goodhue County Cooperative area is primarily agriculture based. Corn and soybeans are the major crops, along with a significant number of dairy farms. Alfalfa and small grains are also grown to some extent. The terrain in the service area varies from relatively flat in some portions to gently rolling in other parts and to extremely hilly and wooded in other areas. In addition rural residential housing is increasing due to employment in the Rochester and Twin Cities areas.

The economy of Goodhue County Cooperative Electrical Association's service area has seen an increase in population attribute to the following factors:

- Demographics – There is a trend of population growth due to the increasing numbers of people choosing to live in the area and work in the Twin Cities and Rochester areas;
- Improved Infrastructure – Continued improvement in basic services such as schools, hospitals, roads, and telecommunication has made the area a great place to live;
- Quality of Life Concerns – The rural/small town atmosphere of the area attracts real estate developers and home buyers.

### **Minnesota Valley**

Minnesota Valley Electric Cooperative (MVEC) service area includes a major portion of Scott, LeSueur, Sibley, and Carver Counties, and smaller portions of Blue Earth, Dakota, Rice, Hennepin, and Waseca Counties.

The economy of Minnesota Valley Electric Cooperative's service area is principally based on agriculture and light industry. The area has seen an increase in population attributed to the close proximity to the Minneapolis/St. Paul metro area, which strongly influences residential growth. Consumer growth is especially prevalent in the northern portion of MVEC's service territory.

### **Steele Waseca**

Steele Waseca Cooperative Electric (SWCE) serves parts of Blue Earth, Dodge, Faribault, Freeborn, Goodhue, LeSueur, Rice, Steele, and Waseca counties.

The economy of Steele-Waseca Co-op Electric's service area has seen an increase in population attributed to a trend of new housing developments in the Lonsdale area and continued improvement in basic services such as schools, hospitals, roads, and telecommunications. Agricultural related activity continues to be significant.

### **Existing System**

The region is served from the XEL - GRE integrated transmission system and the Alliant Energy system. The majority of the delivery point substations are served from the 69 kV system. As larger loads develop, such as the ethanol plant at Al-Corn, more load will be connected to the 115 kV and 161 kV transmission lines. The major sources to the region from the 345 kV system are at Adams,

## GRE Long-Range Transmission Plan

Byron, Prairie Island, West Lakefield and Wilmarth. The 69 kV system has sources from the 115 kV system at Cannon Falls, Carver County, Loon Lake, West Faribault and Wilmarth; and from the 161 kV system at Byron, Hayward, Owatonna, Spring Creek and Winnebago. The 69 kV system also connects to the Dakota and Scott County study region at Northfield and New Prague, and the Southwestern Minnesota study region at Madelia.

Since the last GRE long range plan, The XEL loads at Wilmarth and Eastwood have been transferred from the 69 kV system to the 115 kV system and the Al-Corn substation has been added to the 161 kV. Additional, new 115 kV circuits from Wilmarth to Eastwood and from Eastwood to West Faribault have been added to help alleviate the Wilmarth 115/69 kV transformer overloading that will be mentioned below (existing deficiencies).

### Reliability and Transmission Age Issues

This area covers BENCO Electric Cooperative, Goodhue County Cooperative Electric Association, and Steele Waseca Cooperative Electric.

#### Transmission Lines on List of 50 Worst Composite Reliability Scores

Line 142	Wilmarth 4S43/4S45 - Madelia 761 (BE-MD, BE-SC, BE-DM, SW-DM,	Rank: 1
Line 144	Wilmarth 4S40,4S42 - Cleveland 4S100 - Waterville 193 (BE-CJ, BE-JA,	Rank: 14
Line 192	Cleveland 4S99/4S100 69KV (MV-CLX, MV-ST)	Rank: 18
Line 235	W. Owatonna 4S73 69KV (SW-RB, SW-PRT)	Rank: 21
Line 239	Albert Lea Westside 629 (SW-MB)	Rank: 30
Line 121	Cannon Fls 105 – Sp. Crk 4H7/4H8 - W. Hastings 4P78 (DA-HA, DA-HM,	Rank: 40
Line 145	Winnebago Local 746 69KV (BE-WCT, BE-SCT, BE-GCT)	Rank: 45
Line 150	Spring Creek 4H6/4H9 - Zumbrota 4H15 (GO-SG, GO-WG, GO-WZ)	Rank: 50

#### Transmission Lines Built before 1980

Line 142	Wilmarth 4S43/45- Madelia 69KV (BE-SC, BE-DM, SW-MD)	15 Mi.-1951-58; 33 Mi.-1964-68
Line 144	Wilmarth 4S40/42– Cleveland – Waterville 69KV (BE-JA)	4 Mi.-1969
Line 192	Cleveland 4S99/4S100 69KV (MV-ST)	4 Mi.-1962
Line 235	W. Owatonna 4S73 69KV (SW-RB)	9 Mi.-1953
Line 239	Albert Lea Westside 629 69KV (SW-MB)	11 Mi.-1950
Line 121	Cannon Falls 105-Sp.Crk-W. Hastings 69KV (GO-GS, -VAT)	11 Mi.-1969-77
Line 145	Winnebago Local 746 69KV (BE-SCT, -WCT, -GCT)	14 Mi.-1975-78
Line 150	Spring Creek 4H6/9– Zumbrota 69KV (GO-SG, -WG, -WZ)	28 Mi.-1968-74
Line 140	Bricelyn 720 – Winnco 34NB42 69KV (BE-BRT)	1 Mi.-1958
Line 143	Walters 628 - Winnebago Jct. 69KV (BE-WIT)	1 Mi.-1975
Line 148	Arlington 4S199 -Traverse 69KV (MV-JET, BE-NST)	8 Mi.-1966-69
Line 149	Wilmarth 4S46/48–Traverse 69KV (BE-JO)	1 Mi.-1974
Line 151	Faribault 4S62 - Zumbrota 69KV (GO-CGT, SW-WC)	8 Mi.-1963-67
Line 153	Zumbrota 4H13 69KV (GO-LET)	1 Mi.-1964
Line 236	Faribault 4S61-Northfield–W. Faribault 69KV (SW-FC)	10 Mi.-1959; 5 Mi.-1973
Line 237	Waseca 647 – W. Owatonna 4S76 69KV (SW-OM)	6 Mi.-1952

The reliability for this region varies across the area. Overall the reliability is similar to the GRE average, but this area also has the worst ranked reliability line. Part of this area is served from the Xcel Energy and Alliant 69 kV systems. The line age table shows several segments of older line where replacement may need to be considered. The line age and maintenance information for

## GRE Long-Range Transmission Plan

several of the lines in this area are not complete since data for the lines owned by the other utilities is not included.

Line 142 from Wilmarth to Madelia is a 101 mile 69 kV line serving seven substations. The line also has open switch connections to the Alliant Energy system from Albert Lea Westside and Walters-Winnebago Jct. Its performance is among the worse lines on all six of the indices used, with the worst performance on three of the indices. The three are substation momentary outages, substation long term outages, and substation hours out. Part of the reason for the poor performance is the long line exposure and the high number of substations supplied. The GRE maintenance reports show some significant activity with a large number of bad pole grounds on the BE-DM line section, a few pole condition incidents on the BE-MD and BE-SC lines, and a few other various incidents. Maintenance records are not complete since part of the line is owned by Xcel Energy. Present plans call for the construction of a new 115 kV loop around the southern Mankato area and new 115/69 kV sources at two new substation locations: South Bend and Stoney Creek. This new sources will break up the line exposure into smaller segments to reduce the numbers of substations outages during a single incident.

Line 144 from Wilmarth to Cleveland and Waterville is a 46 mile 69 kV line serving four substations. Its performance is among the worse lines on all six of the indices used, mainly due to a high number of outages and long outage durations. The maintenance reports do not show much activity, but part of this line is owned by Xcel Energy. Fault locating relays were added at Cleveland in 2005 to improve outage response time and the Eagle Lake tap switch was replaced in 2006.

Line 192 from Cleveland is a 32 mile 69 kV line serving three substations. The line has open switch connections to Le Sueur and the Montgomery 69 kV substation. Its performance is among the worse lines on all six of the indices used, mainly due to a high number of outages and long outage durations. The maintenance reports do not show much activity, but most of this line is owned by Alliant Energy. Fault locating relays were added at Cleveland in 2005 to improve outage response time

Line 235 from West Owatonna is a 48 mile 69 kV line serving three substations. The line has open switch connections from the Austin and Hayward substations. Its performance is worse than the GRE average on all six of the indices used, mainly due to a high number of long term outage events. The GRE maintenance reports show a few incidents with a variety of causes on the SW-RB section, but part of the line is owned by other utilities resulting in incomplete maintenance data. There are no recent or current projects to improve reliability for this line.

Line 239 from Albert Lea Westside is a 35 mile 69 kV line serving two substations. This line has open switch connections to the Waseca Jct.-Loon Lake line and the Wilmarth-Madelia line. Its performance is worse than the GRE average on all six of the indices used. The maintenance reports do not show much activity, but most of this line is owned by Alliant Energy. There are no recent or current projects to improve reliability for this line.

Line 121 from Cannon Falls to Spring Creek and West Hastings is a 41 mile 69 kV line serving five substations. Its reliability performance is worse than the GRE average on four of the six of the indices used, due to a high number of momentary events and the high number of substations served by this line. The maintenance reports show a number of incidents related to insulators on the DA-HM line, but not many other issues. About half of the line is owned by Xcel Energy. The Miesville tap to Byllesby Jct. (DA-MI) line was rebuilt in 2006 and the Spring Creek relay and RTU replacement project will be completed in 2007. These projects will help improve reliability for this line.



## GRE Long-Range Transmission Plan

Line 145 from Winnebago is a 37 mile 69 kV line serving three substations. The line has an open switch connection to the Wilmarth-Madelia 69 kV line at Garden City. Its performance is worse than the GRE average on five of the six indices used, mainly due to higher momentary outage events and higher outage durations. The maintenance reports do not show much activity, but most of this line is owned by Alliant Energy. There are no recent or current projects to improve reliability for this line.

Line 150 from Spring Creek to Zumbrota is a 38 mile 69 kV line serving two substations. Its performance is worse than the GRE average on four of the six indices used, mainly due to higher outage durations. The maintenance reports do not show much activity; only a small part of this line is owned by Xcel Energy. Spring Creek relay and RTU replacement projects will be completed in 2007 to help improve reliability for this line.

### **Mankato 69 kV and 115 kV Area**

This area covers the load served by the Wilmarth 115 kV and 69 kV systems in the area around Mankato. The loading of the 69 kV loop includes the 69 kV loop around the city as well as the 69 kV lines that tap this loop and serve the areas down to Minnesota Lake and Madelia. Separate discussions of the analysis of these other areas will be discussed in the Mankato—Madelia and Mankato—Minnesota Lake sections later in this report.

### **Existing and long-term deficiencies**

There are two primary deficiencies in the Mankato area. The first is the heavy loading on the three, 70 MVA 115/69 kV transformers at the Wilmarth substation. Within the last five years, the Xcel Energy load at Eastwood has been transferred to the 115 kV source to alleviate the possible transformer overloads. However the area load continues to grow and a more permanent solution is needed.

The second deficiency is the reliability of the 69 kV circuit from Wilmarth to Madelia/Minnesota Lake. This poor performance of this has resulted in its ranking as the worst performing circuit on the GRE system. This deficiency was addressed in the last long range plan. In 2003, GRE attempted to construct a new 69 kV breaker station on the southeast side of the Mankato 69 kV loop (known then as Hungry Hollow), but the local permitting could not be obtained due to township ordinances prohibiting electrical substations. Therefore this issue still exists.

In the long term a third deficiency will become apparent. This is the overload of the conductor on the 69 kV loop as the load in the city continues to grow.

### **Planned additions**

In order to address the concerns mentioned above, a joint GRE-Xcel Energy study was conducted since the last GRE long range plan. A longer term, more permanent solution was recommended which establishes a new 115 kV loop to replace the 69 kV loop. New 115/69 kV delivery points will be established on the southeast (Stoney Creek) and southwest (South Bend) corners of the city to feed the 69 kV lines to Minnesota Lake and Madelia as well as an Xcel Energy substation (Sibley Park) which will remain on the 69 kV system. The expected completion of this project is summer, 2010. Depending on the load growth over the next couple of years, this should be in time to prevent overloading of the 115/69 kV transformers.

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### Mankato-Madelia 69 kV Area

This area includes a 69 kV transmission line between the new South Bend substation, described in the “Mankato 69 and 115 kV Area” above, and the Madelia breaker station. The loads along this line include municipal and cooperative substations. Sources to the 69 kV system are located at Fox Lake, Rutland and South Bend.<sup>1</sup>

#### **Existing System Deficiencies**

A large, ethanol load was added to this 69 kV line at the Northstar substation in 2006. This addition has resulted in concerns about low voltages along this circuit for the contingent loss of the South Bend source, which is the nearest source. Capacitors were added to the substation that serves the ethanol plant and this has resolved the near-term deficiencies. If expansion of the ethanol production at Northstar occurs, with a corresponding increase in load, additional transmission will be necessary.

#### **Long Term Deficiencies**

Concerns about voltage spikes during capacitor switching have highlighted the need for a more permanent solution. Based on power flow analysis additional transmission will be required sometime in the 2015 time frame. Further discussion of this area can be found in the Southwestern section of this report.

### Mankato—Minnesota Lake 69 kV Area

This area consists of a 69 kV line from Stoney Creek<sup>2</sup> to Minnesota Lake and Danville. The normal source for this is the Stoney Creek 115/69 kV substation. During outages of this source, line switching allows the loads to be served from the 69 kV source at Albert Lea.

#### **Existing System Deficiencies**

There are no existing deficiencies in this area.

#### **Long-term Deficiencies**

Based on load projects for the area deficiencies will occur in the 2015 time frame during contingency loss of the 69 kV source at Stoney Creek. The back-up source is located a relatively long distance away at Albert Lea and the voltages at Decoria and St. Clair can no longer be adequately supported.

The long term solution proposed is a new 69 kV line (built at 115 kV) between the Loon Lake substation near Waseca and the St. Clair substation southeast of Mankato. The project consists of the following components:

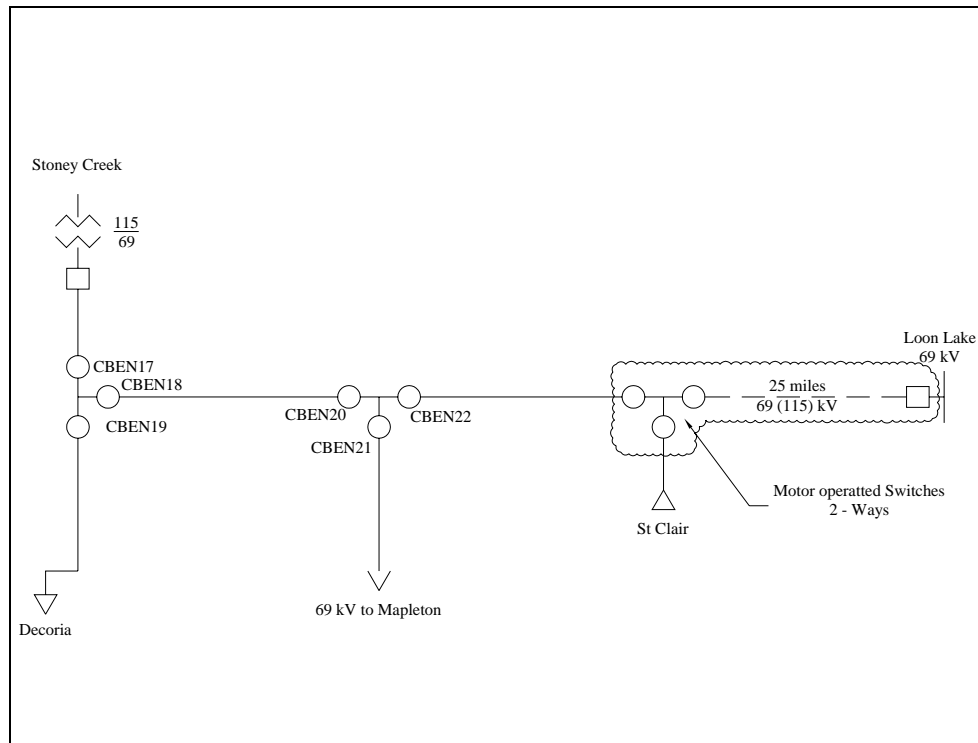
- 25 miles of 69 kV line, 477 ACSR, built to 115 kV standards, initially operated at 69 kV
- 69 kV breaker addition at the Loon Lake substation
- 3-way, motor operated switch at the St. Clair substation

<sup>1</sup> The South Bend source is under development and is expected to be in service in 2010.

<sup>2</sup> The Stoney Creek source is under development and is expected to be in service in 2010.

## GRE Long-Range Transmission Plan

The total estimate cost for this project is approximately \$10,000,000. This project is needed by the summer of 2016. A diagram of the proposed project is shown below.



Proposed Loon Lake—St. Clair 69 kV project

### **Wilmarth-Carver County 69 kV Area**

The Wilmarth-Carver County 69 kV area covers the transmission system from Wilmarth (Mankato) to Arlington and Carver County, and also to Cleveland and Montgomery. This area includes the cities of St. Peter, LeSueur, and LeCenter. The primary sources for this area are the Wilmarth and Carver County 115/69 kV substations, but there are connections to other 69 kV areas at Arlington and Cleveland, and an open tie at Montgomery. The Cleveland tie connects back to Wilmarth-West Faribault 69 kV line.

Analysis for this area was recently (2008) compiled in a joint Alliant (ITCo), GRE and Xcel Energy study, conducted by Xcel Energy, entitled "*North Mankato Load Serving Study*". The discussion shown below includes information from this study.

### **Long-term Deficiencies**

This area will experience overloading of those sections of Traverse—Wilmarth 69 kV transmission line that have 2/0 copper conductor. Low voltages will also occur at peak load levels in the St. Thomas area for outages of the Wilmarth-Eastwood-Eagle Lake line or the Eagle Lake-Jamestown Tap line.

## **GRE Long-Range Transmission Plan**

An outage of the Wilmarth-Johnson Tap-Penelope Tap 69 kV line will overload the Eagle Lake-Jamestown Tap line at present loads, overloads Jamestown Tap-Cleveland starting about 2010, and results in low voltage at LeSueur starting in 2012.

A Traverse-St. Peter 69 kV line outage will result in low voltage from St. Peter to Montgomery at present load levels, and overload the Eagle Lake-Jamestown Tap and Jamestown Tap-Cleveland lines. Traverse-Traverse line outages result in low voltages at LeSueur in the existing system, followed by low voltages on other substations north of Traverse in subsequent years. The outage of the LeSueur Tap-LeSueur 69 kV line will result in low voltage from LeSueur to Montgomery at present load levels. This outage will overload the Cleveland-LeCenter line starting in 2010 and the LeCenter Tap-St. Thomas Tap starting in 2012.

Another long-range loading problem will occur on the Johnson Tap-Johnson line. The load forecast for this study has the Johnson load exceeding the rating of the line by 2020.

### **Alternatives**

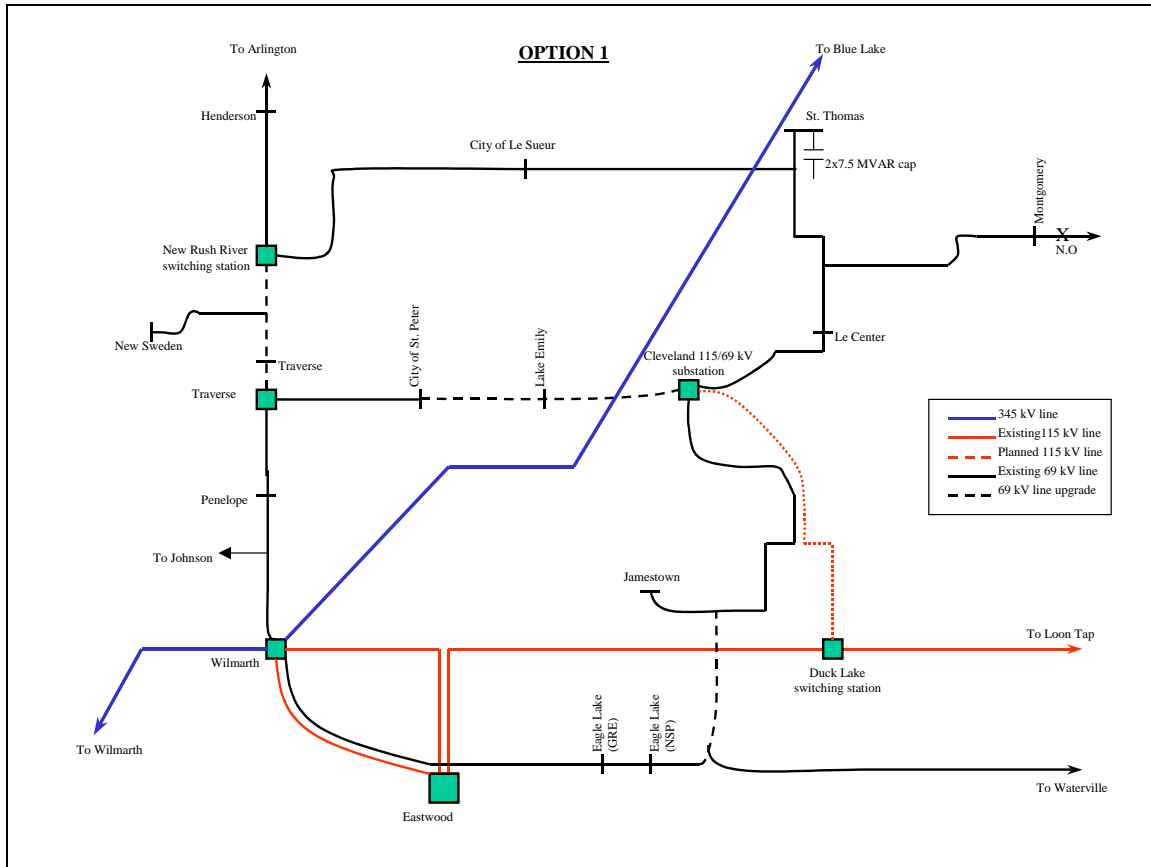
Due to the topology on the transmission system in this area, it is found that a new 115 kV source in the region northeast of Wilmarth is the most optimal solution to meet the transmission needs in this region. A new source will help alleviate the load on the other two sources to the region out of Wilmarth.

# GRE Long-Range Transmission Plan

Two options have been developed to resolve the deficiencies in this area.

## Option 1

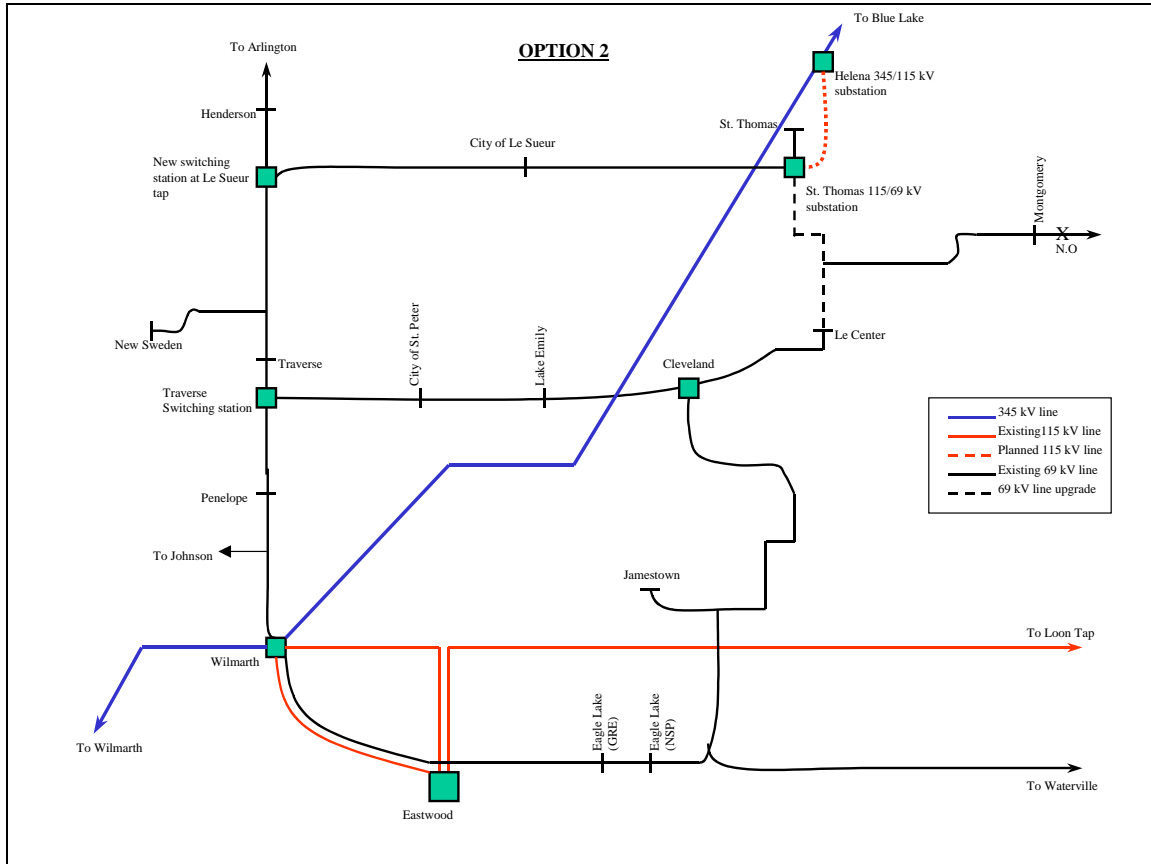
Option 1 proposes to build a new switching station (Duck Lake) on the 115 kV line between Eastwood and Loon tap, build a new 115 kV line from Duck Lake – Cleveland and build a new 115/69 kV substation at Cleveland. Along with the above additions, a number of 69 kV system upgrades and additions are required to avoid any new violations on the underlying system. The total cost for Option 1 is \$28,100,000. The figure below illustrates the new transmission lines required by this option.



# GRE Long-Range Transmission Plan

## Option 2

This option proposes to build a new 115 kV line from the future, proposed Helena 345 kV substation<sup>3</sup> to St. Thomas. This will involved installing a new 345/115 kV transformer at Helena, build new 115 kV line from Helena to St. Thomas and a new 115/69 kV substation at St. Thomas. Similar to Option 1 this plan also requires a number of 69 kV system upgrades in order to avoid overloading the underlying system. The total cost for Option 2 is approximately \$21,950,000. The figure below illustrates the new transmission lines required by this option.



The cost estimates and the project elements for the two options from the North Mankato Load Serving Study are included in the following excerpt.

<sup>3</sup> The Helena substation projects is part of the CapX2020 development.

## GRE Long-Range Transmission Plan

### Estimated Cost of facilities (from North Mankato Load Serving Study)

The cost of facilities associated with options 1 and 2 are listed in Tables 1 and 2. The estimates are typical planning level estimates used for comparing multiple options.

Table 5.1

Facility	Year	Cost
New 115 kV line from Cleveland – Duck Lake (12.5 miles)	2011	\$5,000,000
New 115 kV breaker station at Duck Lake	2011	\$4,000,000
New 115/69 kV substation at Cleveland	2011	\$7,500,000
Capacitor Banks at St. Thomas	2011	\$2,000,000
Upgrade Cleveland – Lake Emily – St. Peter line to 477 ACSR 6 miles	2011	\$1,800,000
Traverse – New Sweden – Rush River 69 kV line to 477 ACSR 7.1 miles	2011	\$2,130,000
Reterminate the Le Sueur – Le Sueur tap line into Rush River 2 miles	2011	\$600,000
New 69 kV switching station at Rush River	2011	\$3,000,000
Increase capacity of Eagle Lake tap – Jamestown tap line.	2011	1,300,000
Rebuild Cleveland – LeCenter 69 kV line to 336 or 477 ACSR	2011	\$2,070,000
<b>Total</b>		<b>\$29,400,000</b>

Table 5.2

Facility	Year	Cost
New 345/115 kV transformer at Helena (assuming Helena sub already exists)	2011	\$6,000,000
New 115/69 kV transformer at St. Thomas	2011	\$7,500,000
New 115 kV line from Helena to St. Thomas (6 miles)	2011	\$2,400,000
Upgrade St. Thomas – LeCenter 69 kV line to 477 ACSR (11 miles)	2014	\$2,750,000
New Breaker station at Le Sueur tap	2011	\$3,000,000
SPS to trip the 345/115 kV TR at Helena	2011	\$300,000
Increase capacity of Eagle Lake tap – Jamestown tap line.	2011	\$1,300,000
<b>Total</b>		<b>\$23,250,000</b>

### Other Alternatives Considered

*Lake Marion – St. Thomas 115 kV line:* This option builds a new 115 kV line from Lake Marion to St. Thomas and a new 115/69 kV substation and 30 MVAR capacitor at St. Thomas. Analysis indicated that this option does not provide long term benefits. Lake Marion is not a strong source and the voltages drop steeply due to the weak source and length of the new line. This option was not studied any further.

*Distributed generation:* Based on the analysis it was found that the system intact voltages could drop to below 95% by 2017. Since the generators cannot be turned on when the voltages drop below 95%, the distributed generation has to run during on and off peak conditions making it a must run unit. For this reason, this option was not studied further.

## GRE Long-Range Transmission Plan

### Recommendation

The recommended plan is option 2 which recommends building a new 115 kV line from the proposed Helena 345 kV substation to St. Thomas. This plan is less expensive than option 1 and provides a strong source to the region with minimum upgrades on the 69 kV system. A special protection scheme (SPS) that trips the 345/115 kV transformer during the loss of Helena – Blue Lake or Helena – Wilmarth 345 kV line avoid overloading the underlying system. The need for this SPS will be re-evaluated after the 345 kV lines from Franklin to Helena to Lake Marion are inservice.

Another long-term vision<sup>4</sup> for this region is to convert the 69 kV line from Scott County to Gifford Lake to Merriam to Jordan to Helena to 115 kV. Some sections of this existing line are already built to 115 kV specifications. The proposed Helena – St. Thomas 115 kV line can be extended to the new switching station at Rush River by converting the St. Thomas – Le Sueur – Rush River 69 kV line to 115 kV and then extending it either to Fort Ridgely or High Island.

### West Faribault—Wilmarth 69 kV Area

The 69 kV line between West Faribault and Wilmarth (Mankato) serves load at Elysian, Morristown, Walcott, Warsaw and Waterville. The sources to this circuit are the 115/69 kV substations at Wilmarth and West Faribault. With the proposed addition of other sources north of this area (see section on the Wilmarth—Carver County 69 kV system) this analysis concentrated on the outage of either end of the 69 kV line between the Jamestown tap and West Faribault.

### **System Deficiencies**

Low voltages will occur at Walcott for the loss of the Walcott—West Faribault 69 kV line beginning in approximately 2015, however this undervoltage may occur sooner if the transmission improvements in the Helena-St. Thomas area are not completed (see Wilmarth—Carver County section above). No line overloads are expected for outages of either source except for the Eagle Lake—Jamestown 69 kV line.

### **Alternatives**

Three options were developed for this area in the previous GRE long range plan (2003). A cursory review indicates that these options are still valid for this area. The costs have been updated to more current cost estimates.

The first option adds a new 115/69 kV source in the middle of the area at Waterville. This source would replace the 69 kV source from West Owatonna (Loon Lake) that was removed when the Loon Lake-Waterville line was converted to 115 kV. Option 2 extends the life of the existing 69 kV system by moving the Waterville and Elysian loads to the 115 kV system. Option 3 relies on rebuilding overloaded 69 kV lines, adding capacitors, and adding a Morristown 69 kV breaker station to connect to the Alliant Waseca Jct.-Montgomery line.

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<sup>4</sup> The long-range vision is based on the assumption that there will be load growth between Carver and Mankato due to metro area expansion. The area has to be restudied as the deficiencies are identified in the future.



## GRE Long-Range Transmission Plan

Rebuilding the Eagle Lake-Jamestown Tap 69 kV line with a large size conductor is included in all three of the alternatives. Other options to resolve the overloading of this line are much more expensive. Rebuilding the line is a low cost option to defer high cost line and substation additions.

The following are options that were considered:

### Option 1: Build Waterville 115/69 kV Source

To provide the additional capacity and voltage support needed in the area, Option 1 adds a 115/69 kV source at Waterville. If the new substation connects to the 69 kV system at a different location, such as Elysian or Morrystown, some of the 69 kV lines would need to rebuild to higher capacity.

The following is the estimated timeline for Option 1 installations:

Estimated Year	Facilities	Cost
2009	Eagle Lake-Jamestown – Rebuild Tap 69 kV Line	\$1,269,000
2014	Waterville - add 115/69 kV Substation	\$3,361,000

### Option 2: Move Waterville and Elysian Load to 115 kV

This option reduces the loading on the 69 kV system by moving the Waterville and Elysian loads to the 115 kV system. The Elysian substation is located close to the existing 115 kV line and would only require a short tap, in additions to rebuilding the substation high side and replacing the transformer. Waterville is the largest load on this line. It will require approximately one-half mile of 115 kV and more extensive substation changes to convert three transformers to 115 kV and also maintain the 69 kV system continuity.

The following is the estimated timeline for Option 2 installations:

Estimated Year	Facilities	Cost
2009	Eagle Lake-Jamestown – Rebuild Tap 69 kV Line	\$1,269,000
2014	Waterville and Elysian - Convert to 115 kV	\$3,420,000

### Option 3: Upgrade 69 kV System

Option 3 upgrades the 69 kV facilities to maintain system performance. It includes rebuilding overloaded lines, adding a capacitor to provide voltage support, and adding a breaker station to tie to the Alliant Waseca Jct.-Montgomery 69 kV line. The timing of the switching station is linked to low voltages for loss of the West Faribault source and overloading of the Warsaw-Morrystown line for loss of the Wilmarth source. The Warsaw capacitor addition provides a five year deferral until 2018 and the switching station addition avoids the need to rebuild the Warsaw-Morrystown line.

The following is the estimated timeline for Option 3 installations:

Estimated Year	Facilities	Cost
2009	Eagle Lake-Jamestown – Rebuild Tap 69 kV Line	\$1,269,000
2014	Warsaw – Add 5.4 MVar Capacitor	\$236,600
2018	Jamestown Tap - West Faribault rebuild 69 kV Line	\$15,678,000
2018	Morrystown - Build 69 kV Switching Station	\$2,032,000

## GRE Long-Range Transmission Plan

### **Generation Options**

Generation is an option for this area if connected to the 69 kV system and operated whenever loads are high enough to cause contingency problems, however the cost of generation installation would be much higher than the transmission options and therefore is not evaluated any further.

### **Viability with Growth**

Each of the plans above have similar viability to supply additional growth, depending on where the growth occurs. Options 1 and 2 are stronger than Option 3 for growth at Waterville. Option 1 provides the best contingency support for this area and is the least cost plan. It is recommended that GRE and Xcel Energy follow the plan in Option 1, but encourage the consideration of 115 kV sources if distribution substations are added or upgraded.

### **Faribault-Northfield 69 kV Area**

The Faribault-Northfield 69 kV area includes the cities of Faribault and Northfield and the 69 kV system serving the cities and surrounding loads. The sources to this area are the West Faribault and Cannon Falls 115/69 kV substations and the Dakota County area 69 kV system from Farmington. There is also a normally open 69 kV tie to New Prague.

### **Long-term Deficiencies**

Several projects have recently been completed in this area to upgrade the West Faribault source to the 69 kV system related to a planned generation addition connecting to the West Faribault 115 kV system. This has included the replacement of the 2x25 MVA and 50 MVA 115/69 kV transformers with two 112 MVA units. Several of the 69 kV circuits from the West Faribault substation have also been upgraded to 795 ACSR conductor to eliminate overloading.

Subsequent to the West Faribault generation, a 350 MW generator was added at a new Colville substation north of Cannon Falls. This addition required upgrading the 115/69 kV transformers at Cannon Falls to two 112 MVA units which eliminated any overloads of the transformers for outages in the Northfield—West Faribault area.

A remaining critical outage in this area is the loss of the Fair Park-Circle Lake Tap 69 kV line. This outage results in low voltage at Circle Lake starting in 2019, however it is expected that the addition of the new Helena 345/115/69 kV substation (see Wilmarth—Carver County 69 kV Area section above) in 2015 will improve the voltage in New Prague, which is the source for Circle Lake during the contingency.

With the addition of the transmission projects associated with the addition of the generation at West Faribault and Cannon Falls (Colville) no significant deficiencies are found until 2021. Line overloads might be possible if the load or generation pattern changes from that included in the power flow models, however no alternatives were developed for this area in this plan.

### **Byron Zumbrota 69 kV Area**

The Goodhue-Byron 69 kV area covers the Goodhue Cooperative area and the 69 kV lines connecting to Byron. Sources to the 69 kV system are from the Cannon Falls and West Faribault 115/69 kV substations and the Spring Creek and Byron 161/69 kV substations. The largest loads are the cities of Dodge Center, Kasson, and Byron on the south edge of the area, Zumbrota and Pine Island along the east-central part of the area, and Cannon Falls on the north side of the area. The city of Red Wing is located at the northeast corner of this area, but has not been included in

## GRE Long-Range Transmission Plan

the study. The 69 kV system is characterized by long lines with no higher voltage transmission in the area, except the Prairie Island-Byron 345 kV line.

### Long-term Deficiencies

The deficiency in this area occurs during an outage of the Byron 161/69 kV transformer. This outage results in low voltages at the Byron (0.873 pu) and Kasson (0.878 pu) 69 kV buses. It should be noted here that the wind generation at Dodge Center (Garwind) was modeled as zero output to represent low wind conditions at summer peak.

A multi-state switching procedure could be used to restore the voltage to the Byron and Kasson buses. This would involve closing in from Dodge Center to Claremont Junction, opening Dodge Center to Kasson and closing Kasson to Pine Island. The use of switching procedures is a viable option because the load will be outages during the contingency and system operators will have time to plan for the restoration of the load.

Alternatives that could be evaluated further and avoid the multi-stage switching procedures are:

- Second 161/69 kV transformer at Byron
- 161/69 kV transformer at Dodge Center

### Alternatives

No alternatives were evaluated for this area since the load could be restored with switching procedures.

### Owatonna-New Prague 69 kV Area

This area consists of the Alliant Energy 69 kV line from West Owatonna to Montgomery and New Prague and the GRE line to Claremont. The West Owatonna 161/69 kV substation is the main source for this line, along with the Loon Lake 115/69 kV source at Waseca and a connection to the Scott County 69 kV system at New Prague. There is also an open connection at Montgomery to the Wilmarth-Carver County 69 kV area and an open connection from the Claremont substation to the Dodge Center-Kenyon 69 kV line. The largest loads are at Montgomery and New Prague.

### Long-term Deficiencies

The analysis for this area was completed with the assumptions that the Montgomery gas turbine would not be operated for normal peak load times, but the New Prague diesel generation would be on-line.

The first deficiency is low voltage (0.910 pu) at New Prague in 2021 for the outage of the Jordan—New Prague 69 kV line outage. A second deficiency is the overload, also in 2021 of the Montgomery—New Prague 69 kV line to 122%. This line is rated 36 MVA.

### Alternatives

This area was included in the *North Mankato Load Serving Study*<sup>5</sup> conducted by Xcel Energy in 2008. Several alternatives were evaluated in this study including:

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<sup>5</sup> This study is presently in draft form however the recommended projects in the study are not expected to change.

## GRE Long-Range Transmission Plan

- Option 1: A new 115 kV line from a tap point on the Eastwood—West Faribault line and a new 115/69 kV source at Cleveland.
- Option 2: A new 345/115/69 kV substation in the Helena area and a tap on the Blue Earth—Wilmarth 345 kV line.

Distributed generation was also discussed in the study report. However, due to the low voltages and numerous contingencies that had to be covered by distributed generation, it was not studied further.

The study recommended proceeding with Option 2 (the new 345/115/69 kV substation at Helena) based on the lower cost and the anticipated construction, by 2017, of a new 345 kV breaker station as part of the CapX2020 project. GRE's portion of Option 2 is expected to include the following costs:

- 2011: Rebuild (increase the capacity of) the Eagle Lake tap—Jamestown 69 kV line -- \$1,300,000
- 2014: A portion (est. 3.5 miles) of the 11 mile rebuild of the St. Thomas—LeCenter tap 69 kV line -- \$1,450,000

Transmission diagrams and additional cost information are included in the Wilmarth-Carver County 69 kV discussion above.

### **Viability with Growth**

Addition of a new 345/115/69 kV source in the Helena will provide strong transmission support into an area that is expected to see significant load growth in the near future. This option provides capabilities to convert some existing 69 kV transmission lines and loads to 115 kV as increased area development continues.

### **Owatonna and South 69 kV Area**

This area includes the Alliant 69 kV system south of Owatonna down to Albert Lea including the GRE loads of Bixby, Pratt, and River Point. The source to this area is the 69 kV bus at Owatonna. The 69 kV has a normally open connection south of River Point to the Hayward 116/69 kV substation and a normally open connection to Blooming Prairie from Bixby. Blooming Prairie is on the Dairyland 69 kV system supplied from the Austin 161/69 kV substation.

### **Long-term Deficiencies**

No deficiencies were found in the 69 kV system between Owatonna and Albert Lea.

### **Alternatives**

No alternative were developed for this area.

### **Faribault—Owatonna—Alcorn—Byron 161 kV System**

This area covers that 161 kV transmission line between West Faribault and Bryon. This line serves as the source for the large 161/69 kV substation at Owatonna and the 161 kV Steele Waseca Al-Corn substation. Sources to this line are the Byron 345/161 kV substation and the South Faribault 115/161 kV substation.

## GRE Long-Range Transmission Plan

### Long Term Deficiencies

The long term deficiency for this area is the outage of the Al-Corn—Byron 161 kV line. This outage results in a 0.900 per unit voltage at the Al-Corn distribution substation in 2021. No overloads were indicated during this outage.

### Alternatives

Only one alternative was considered as a solution to the long-term, low-voltage deficiency. The recommendation is to install a switched capacitor at the Al-Corn substation. The capacitor bank should consist of 2 stages, 15 MVAR each, on the 161 kV bus. Based on power flow analysis the voltage rise for each step during the contingency outage of the Al-Corn—Byron 161 kV line is approximately 2.5%. The in-service date recommended for this capacitor bank is approximately 2018.

### Other considerations

Recent studies<sup>6</sup> by Xcel Energy have recommended additional transmission in the Byron, Loon Lake, and Owatonna areas to increase wind generation outlet capability. There would be some benefit to the Owatonna area if the chosen project establish a new 161 or 115 kV source into Owatonna. This could eliminate the need for, or reduce the size of, the capacitor bank recommended for the Al-Corn substation.

The RIGO studies are still ongoing and the results not yet finalized. No quantitative impact related to the this long range plan for the Owatonna area can be done at this time.

### Waseca-Albert Lea 69 kV Area

The Waseca-Albert Lea 69 kV area covers the 69 kV system from the Loon Lake 115/69 kV substation to the Albert Lea area, which is supplied by the Hayward 161/69 kV substation. The line between these two sources is operated normally open to the north of St. Olaf Lake. The St. Olaf Lake-Matawan line also has a normally open connection to the Pohl Road Tap to Minnesota Lake line, which is supplied from Wilmarth. The largest loads in this area are at Waseca and Albert Lea, but Albert Lea area load is not included in the following table.

### Long-term Deficiencies

There are no deficiencies in the GRE part of the area. No further analysis was done.

### Viability with Growth

This area can handle additional growth with the existing system. Enhancements are needed in the local Albert Lea area, and the Waseca area will also require upgrades for growth beyond this study, but the rural 69 kV line between these source areas will remain adequate. It is recommended that GRE monitor the system enhancements to the sources in this area to maintain reliable service and adequate voltages.

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<sup>6</sup> RIGO (Regional Incremental Generation Outlet) study

## GRE Long-Range Transmission Plan

### Winnebago 69 kV Area

The Winnebago 69 kV area includes the Winnebago-Garden City line and the south part of the BENCO cooperative's area. The main source to this area is the Winnebago 161/69 kV substation. The Winnebago-Garden City line has a normally open connection to the Wilmarth-Madelia 69 kV line, while the lines south and east from Winnebago have another normally open connection to the Wilmarth source at Minnesota Lake and connections to the Albert Lea area 69 kV system at Walters and the Alliant 69 kV system in Iowa. The largest loads in this area are the cities of Winnebago and Blue Earth, but Blue Earth has a second source from a separate 161/69 kV transformer. The following forecast is the load served in this area.

### **Long-term Deficiencies**

There are no deficiencies in this area. As such, no further analysis was done.

### **Viability with Growth**

The existing facilities in this area can supply additional growth beyond the forecast for this study. It is recommended that GRE continue to watch load growth in this area and re-evaluate if additional growth occurs.

### **Recommended Plan**

The analysis for this region included certain generation assumptions that can have significant effects on the adequacy of the power system. Effects on the 69 kV areas of the system are discussed in the individual analysis areas. However, the 115 and 161 kV system from Lake Marion-Wilmarth-Byron was not analyzed in detail with respect to alternate generation schedules. The base case models include Owatonna generation as on-line and 250 MW of new generation at West Faribault by 2006.

The following are the proposed projects for the Southeast Minnesota region:

Estimated Year	Responsible Company	Facility	Cost
2009	GRE	Eagle Lake-Jamestown – Rebuild Tap 69 kV Line	\$1,269,000
2011	CAPX	Helena - New 345/115 kV transformer (assuming Helena sub already exists)	\$6,000,000
2011	XEL	St. Thomas - New 115/69 kV transformer	\$7,500,000
2011	XEL	Helena to St. Thomas - New 115 kV line (6 miles)	\$2,400,00
2011	SMMPA	Le Sueur tap - New Breaker station	\$3,000,000
2011	CAPX	Helena - SPS to trip the 345/115 kV TR	\$300,000
2014	XEL	Waterville – Add 115/69 kV Substation	\$3,361,000
2014	GRE/ITC	St. Thomas – LeCenter - Upgrade 69 kV line to 477 ACSR (11 miles)	\$2,750,000
2016	GRE	Loon Lake-St. Clair 115 kV line	\$9,335,000

# **Attachment E**

Biennial Transmission Plans 2007, 2009, 2011, 2013 (selected)

## 7.7 Southeast Zone

The following table provides a list of transmission needs identified in the Southeast Zone and the map on the following page shows the location of each item in the table.

### Southeast Zone

Tracking Number	Description	Projected In-Service Year	Need Driver	Section No
2003-SE-N1	Rochester & Southeast Minnesota Areas; includes Rochester load serving study and Rochester new transmission tie	2011	Load serving in Rochester and the Greater La Crosse Area	7.7.2
2003-SE-N3	City of Mankato	To be Determined	Transformer Overloads and system reliability	7.7.3
2005-SE-N1	Mankato Generation	2009	Generation outlet	7.7.4
2005-SE-N2	Cannon Falls Generation	2008	Generation outlet	7.7.5
2005-SE-N3	Lake City Area	2008	Load serving; low voltages	7.7.6
2005-SE-N4	Dodge County Wind	To be Determined	Generation outlet	7.7.7
2005-SE-N5	Mower County Wind	To be Determined	Generation outlet	7.7.8
2005-CX-3	CapX 2020 Vision Plan Twin Cities – Rochester – La Crosse 345 kV			7.7.9
2007-SE-N1	Rochester-Adams 161 kV Line	2010	Line subject to overloads due to wind generators around Adams	7.7.10
2007-SE-N2	Grand Meadows Wind	2009	Generation outlet	7.7.11
2007-SE-N3	North Mankato Load Serving	2010	Low voltages and line overloads	7.7.12
2007-SE-N4	Wind Generation Upgrades – Freeborn and Mower Counties	2010	Generation Outlet	7.7.13



### 7.7.12 North Mankato Load Serving

**Tracking Number.** 2007-SE-N3

**Utility.** Xcel Energy and Great River Energy

**Inadequacies.** The study covers most of the areas North and East of the City of Mankato. The total load in the region is approximately 95 to 100 MW. This region is mostly served from the Wilmarth substation through a long 69 kV line. The following problems were observed in the region:

1. Loss of Wilmarth – Penelope 69 kV line will result in low voltages at Le Sueur and thermal overloads on Jamestown – Cleveland 69 kV line.
2. Loss of Le Sueur – Le Sueur Tap line will result in severe low voltages at Le Sueur and St. Thomas, and thermal overload on Cleveland – Le Center 69 kV line.
3. Loss of Traverse – New Sweden 69 kV line will result in low voltages at Le Sueur, New Sweden and Rush River.
4. Loss of Traverse – St. Peter 69 kV line will result in low voltages at St. Peter, Lake Emily and Cleveland.
5. Loss of Wilmarth – Eagle Lake 69 kV line will result in low voltages on the 69 kV line between Eagle Lake – Cleveland – St. Thomas and Lake Emily, and thermal overloads on the line between Wilmarth – Traverse – St. Peter.

**Alternatives.** The list of potential alternatives is still being developed, as preliminary scoping for the load-serving study has only recently begun.

**Analysis.** GRE, SMMPA and Xcel Energy are performing a long-range transmission planning study for this area to address the inadequacies. The study is expected to be completed by the beginning of 2008.

**Schedule.** The load-serving issues have been projected to occur in the 2010 timeframe. After completing the load-serving study, Xcel Energy and Great River Energy will begin the necessary permitting processes in order to have the lines in service during 2010.

### 6.7.9 North Mankato Load Serving

**Tracking Number.** 2007-SE-N3

**Utility.** Xcel Energy and Great River Energy

**Inadequacies.** The study covers most of the areas North and East of the City of Mankato. The total load in the region is approximately 95 to 100 MW. This region is mostly served from the Wilmarth substation through a long 69 kV line. The following problems were observed in the region:

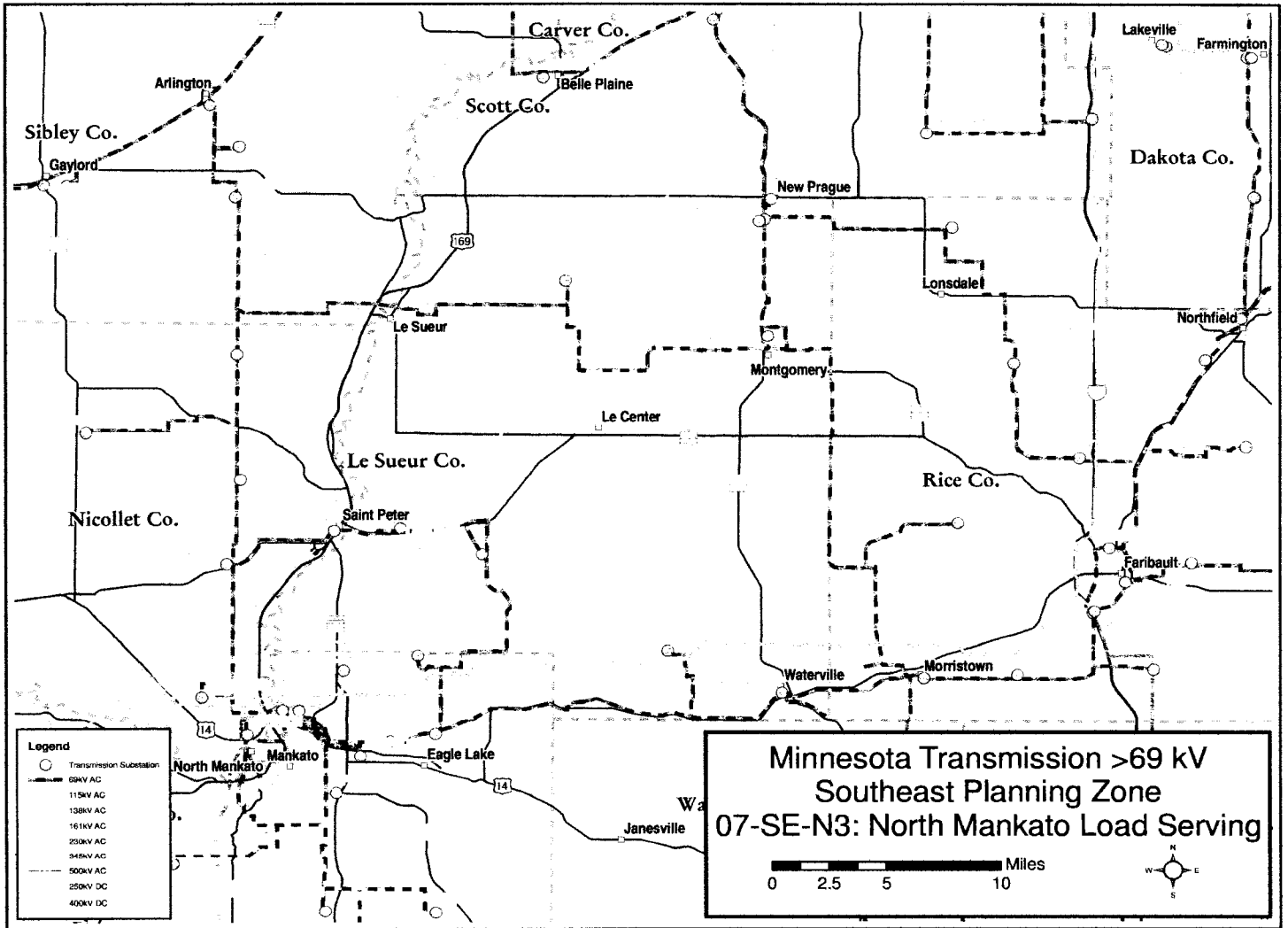
1. Loss of Wilmarth – Penelope 69 kV line will result in low voltages at Le Sueur and thermal overloads on Jamestown – Cleveland 69 kV line.
2. Loss of Le Sueur – Le Sueur Tap line will result in severe low voltages at Le Sueur and St. Thomas, and thermal overload on Cleveland – Le Center 69 kV line.
3. Loss of Traverse – New Sweden 69 kV line will result in low voltages at Le Sueur, New Sweden and Rush River.
4. Loss of Traverse – St. Peter 69 kV line will result in low voltages at St. Peter, Lake Emily and Cleveland.
5. Loss of Wilmarth – Eagle Lake 69 kV line will result in low voltages on the 69 kV line between Eagle Lake – Cleveland – St. Thomas and Lake Emily, and thermal overloads on the line between Wilmarth – Traverse – St. Peter.

**Alternatives.** The North Mankato study jointly performed by GRE, SMMPA and NSP considered two transmission alternatives to address the deficiencies in the region.

**Alternative 1:** This plan consists of bringing a new 115 kV line from the proposed Helena Substation to the 69 kV system near St. Thomas Lake. Depending on the location of the Helena Substation, a new 115 kV line may not be required as the Helena substation could include a 115/69 kV transformer. This alternative also involves building a new 69 kV switching station at LeSueur tap.

**Alternative 2:** This alternative involves building a 115 kV line from the existing Eastwood – West Faribault 115 kV line to the Cleveland Substation and a new 115/69 kV transformer at the Cleveland Substation. This alternative also includes building a 69 kV switching station west of the City of LeSueur.

**Analysis.** Alternative 1 was identified as the recommended long-term plan for the region since the new 345 kV substation at Helena meets the current and future needs of the area.



## 6.8 Southeast Zone

### 6.8.1 Needed Projects

The following table provides a list of transmission needs identified in the Southeast Zone by MISO utilities. There were no projects identified in this zone by non-MISO utilities.

MPUC Tracking Number	MTEP Year/App	MTEP Project Number	CON?	Utility	Description
2005-SE-N4	NA	NA	TBD	XEL	Additional outlet for possible future wind generation
2005-CX-3	2008 / A	1024	Yes	CapX	Add new 345 kV line between Southeast corner of Twin Cities, Rochester, and La Crosse Wisconsin. This line is located in the Twin Cities and Southeast Zones. PUC Docket No. TL-09-1448
2007-SE-N3	2009	2156	No	XEL	1) New 345/115/69 kV Sheas Lake substation between Wilmarth and Proposed Helena substation. 2) 1 mile of 69kV double circuit to connect the existing LeSueure 69kV lines into proposed Sheas Lake substation.
2009-SE-N2	NA	NA	Yes	GRE	St. Clair-Loon Lake 115 kV line This project has been delayed indefinitely due to drop in load growth.
2009-SE-N5	2010/A	2166	No	SMP	St Peter Area Load Serving 69kV Project
2011-SE-N1	2011/A	3313	No	XEL	This project is to install a 69 kV 1 way switch to provide SMMPA's New Prague substation a new interconnection point. The existing interconnection would require cutting the line jumpers when the New Prague - Veslie line is out of service.

### 6.8.2 Completed Projects

Some inadequacies in the Southeast Zone that were identified in the 2009 Biennial Report were alleviated through the construction and completion of specific projects over the last two years. Information about each of the completed projects is summarized briefly in the table below. More information about these projects and inadequacies can be found in the 2009 Biennial Report. Also, additional information is available by contacting the designated person for the utility that was responsible for constructing the project.

<b>MPUC Tracking Number</b>	<b>Utility</b>	<b>Description</b>	<b>PUC Docket</b>	<b>Date Completed</b>
2003-SE-N1	XEL	This project became the CapX2020 project listed in this report as 2011-TC-N14	TBD	TBD
2003-SE-N3	XEL	City of Mankato – 115-kV Loop project	E002,ET2-TL-08-734	May 2009
2005-SE-N5	ITCM	Mower County Wind Upgrades to 161 kV at Adams	Not required	February 2010
2007-SE-N1	DPC	Rochester-Adams 161 kV Line Reconductor 36.7 miles with 795 ACSS conductor	Not required	November 2009
2007-SE-N2	XEL	Grand Meadow Wind Interconnection project	IP6646-WS-07-839	June 2009
2007-SE-N4	ITCM	Wind Generation Upgrades – Freeborn and Mower Counties – Completed 2010	Not required	December 2010
2009-SE-N1	DPC	Harmony-Beaver Creek 161 kV Line. Reconductor 20.5 miles of 161 kV line with 795 ACSS conductor.	Not required	February 2010
2009-SE-N3	ITC	No action necessary.	Not required	2011
2009-SE-N4	SMP	Byron to Rochester Westside 161 kV line addition	Not required	2010

MPUC Tracking Number	MTEP Year/ App	MTEP Project Number	CON	Utility	Description	Date Completed PUC Docket
2011-SW-N7  <i>G491 Upgrades</i>	B	2115	No	XEL	One new 120 MVA, 118-36.2 kV transformer, three new 115 kV breakers and associated disconnect switches, one new 34.5 kV transformer low side main breaker and associated disconnect switches, control house expansion, structural steel and foundations associated with this new equipment, control and protection equipment associated with these new installations.	Project Cancelled.
2011-SW-N9  <i>G358 Winnebago Project</i>	2008/A	2108	No	ITCM	New 161 kV switching station in Faribault Co. on the Winnebago to Winnco 161 line to provide interconnection facilities for MISO Project G358.	June 2012
2011-SW-N10  <i>Sheas Lake Project</i>	2009/A	2156	No	XEL	1) New 345/115/69 kV Sheas Lake substation between Wilmarth and proposed Helena substation. 2) One mile of 69 kV double circuit to connect the existing LeSueur 69 kV lines into proposed Sheas Lake substation	April 2013  Same project as 2007-SE-N3

MPUC Tracking Number	MTEP Year/App	MTEP Project Number	CON?	Utility	Project Description and Timeframe
2011-SE-N6 <i>Crystal Foods</i>	2012/A		No	XEL	New 5.4 MVAR capacitor bank at Crystal Foods in Arlington, MN.
2011-SE-N7 <i>Rochester Upgrades for CapX 2020</i>	2008/A	1024	Yes	XEL/ SMP/ Non- MISO	Add North Rochester - N. Hills 161 kV line. Add North Rochester-Chester 161 kV line. Add 345/161 kV transformers at Hampton Corner, North Rochester, and North Lacrosse.
2013-SE-N1 <i>Byron Transformer</i>	2013/C	4260	No	SMP	Byron TR9 345/161 Transformer failed Aug 2012 and is now being replaced by a Non-LTC transformer. Expected in-service date: January 2014.

## 6.9 Completed Projects

Some inadequacies in the Southeast Zone that were identified in the 2011 Biennial Report were alleviated through the construction and completion of specific projects over the last two years or can be moved to the completed category because changed circumstances have eliminated the need for the project. Information about each of the completed projects is summarized briefly in the table below. More information about these projects and inadequacies can be found in the 2011 Biennial Report. Also, additional information is available by contacting the designated person for the utility that was responsible for constructing the project.

MPUC Tracking Number	MTEP Year/App	MTEP Project Number	CON	Utility	Description	Date Completed PUC Docket
2007-SE-N3	2009	2156	No	XEL	1) New 345/115/69 kV Sheas Lake substation between Wilmarth and Proposed Helena substation. 2) 1 mile of 69 kV double circuit to connect the existing LeSueur 69 kV lines into proposed Sheas Lake substation.	April 2013  Same project as 2011-SW-N10

incremental load-serving capability to serve future load growth in the affected load and Project areas.

#### **6.6.1 New Sheas Lake 69 kV Source**

Great River Energy analyzed whether adding a new 69 kV source to the Scott-Faribault System from the Sheas Lake Substation would address concerns identified in the affected load area. This alternative includes construction of a new 69 kV transmission line from the Sheas Lake Substation to the New Prague Substation. This alternative would address low voltage and transmission line overload concerns on the transmission system serving the area south of Jordan, serving loads at the Sand Creek, New Prague, Veseli, French Lake, and Waseca substations. As part of this alternative, the Carver County—Belle Plaine 4/0 A 69 kV transmission line would need to be rebuilt with 795 ACSR conductor. Rebuilding this line would address overload concerns identified on the Carver County—Belle Plaine 69 kV transmission line and improve the loads served between the Scott County and Carver County substations, serving loads at the Assumption, Belle Plaine, Jordan, Merriam, and Gifford Lake substations.

Though this alternative would be an effective solution for strengthening the system in the affected load area, the cost of this alternative was estimated to be substantially higher than that of the Project. Additional costs would be incurred rebuilding other area facilities that were identified as limiting conductor current carrying capacity, and replacing switches that also contribute to these limits.

Additionally, this alternative does not address the existing operational concerns identified on the existing transmission lines between the Credit River Substation and Prior Lake Junction. These existing 69 kV lines would also require reconductoring. Further, this alternative would require construction of a 10-mile 69 kV transmission line on new right-of-way in addition to over six miles of rebuilt 69 kV transmission line on existing right-of-way. For these reasons, this alternative was considered inferior to the proposed Project.

#### **6.6.2 New Sheas Lake 69 kV and 115 kV Sources**

A second alternative was analyzed that would connect the Sheas Lake Substation to the affected load area, providing both 69 kV and 115 kV sources to the affected load area. This alternative includes upgrading existing 69 kV transmission lines from the Scott County Substation to the Jordan Substation. The alternative also requires construction of a new 115 kV transmission line from Sheas Lake Substation to Jordan Substation, which would allow completion of a 115 kV loop in the area. Further, Gifford Lake, Merriam Junction, and Jordan substations would require upgrades to accept 115 kV service. A new 115 kV/69 kV substation at Belle Plaine is also recommended to provide support to the Assumption and Belle Plaine substations under system intact conditions and provide contingency support to loads south of the Jordan Substation.

In analyzing this alternative, Great River Energy attempted to introduce a redundant 69 kV source from the east in the study. To do this, an attempt was made to close the normally open switch at Veseli by connecting it to the West Faribault Substation through the Circle Lake Substation. Introducing this redundant source, however, resulted in transmission line overload concerns on the Valley Grove—Circle Lake 69 kV transmission line. This overload would



require rebuilding the 9.5-mile 1/0 A conductor along this line with 477 ACSR or larger conductor. This alternative also requires construction of a new breaker station at Valley Grove Junction to avoid creating a three terminal line interconnection at Valley Grove Junction.

Though this alternative would provide voltage support and reduce overload concerns on the Scott-Faribault System, it was determined to be inferior to the Project. The additional transmission line upgrades that would be required to make this alternative operationally equivalent to the Project would cost over twice as much as the proposed Project. This alternative would require construction of a new 10-mile 69 kV transmission line, construction of a new 10-mile 115 kV transmission line, upgrading the 8.5-mile Scott County—Jordan 69 kV transmission line to 115 kV, rebuilding nearly 25 miles of existing 69 kV transmission lines, and making additional substation and breaker station upgrades. Additionally, this alternative would not address the existing overload and low voltage concerns identified on the transmission lines between the Credit River Substation and Prior Lake Junction. For these reasons, this alternative was considered inferior to the Project.

### 6.6.3 New Lake Marion 115 kV Source

A third alternative that was analyzed to address the operational concerns of the Scott-Faribault System was to introduce a new 115 kV source to the affected load area. The Lake Marion Substation is the closest source to the Scott-Faribault System. Additionally, the Black Dog Generating Station is located nearby and provides an additional redundant source for load-serving purposes. This alternative includes constructing a new, nearly 14-mile 115 kV transmission line from the Lake Marion Substation to the new Veseli Substation, installing a 115 kV/69 kV transformer at the new Veseli Substation, and installing 115 kV breakers at Lake Marion. This alternative would leave a 2.5-mile 69 kV line from the Lake Marion Substation to serve loads between the Lake Marion and Glendale Substations as the Cleary-Elko System is entirely 69 kV. Analysis determined that loss of this line overloads the 69 kV transmission line between Prior Lake Junction and Credit River Junction. This would require the 3.5-mile 4/0 A conductor to be rebuilt with 795 ACSS or ACSR conductor.

Though this alternative would address the concerns on both the Scott-Faribault and Cleary-Elko systems, the initial 2016 investment was more expensive than the proposed Project. This alternative, however, would not address the forecast needs in the Cleary Lake area for 115 kV transmission lines. Constructing the 3.5-mile transmission line to 115 kV would result in an even greater cost differential between this alternative and the Project. This alternative, therefore, was determined to be inferior to the Project for overall improvements to the Cleary-Elko System.

## 6.7 Double Circuiting

Double circuiting is the construction of two separate circuits (three phases per circuit) on the same structures. The proposed Project includes approximately 5.4 miles of double circuit 115 kV/115 kV line between the New Market Substation and the Veseli Breaker Station. In this area, double circuit construction has been analyzed and Great River Energy determined that simultaneous outage of both circuits in this segment is not significantly worse than an individual outage of one circuit in the segment. Double circuiting in this area is cost-effective. Great River Energy has proposed double circuit construction to the greatest extent practical in the Project

# Attachment F

CapX 2020 Brookings Route PUC Docket 08-1474

Myrick Information Chart

1/19/2010 Letter (selected)

Poorker to ALJ Luis



January 19, 2010

**VIA ELECTRONIC FILING AND U.S. MAIL**

Hon. Richard Luis  
Administrative Law Judge  
P.O. Box 64620  
St. Paul, MN 55164-0620

**Re: *In the Matter of the Application of the Route Permit Application by Great River Energy and Xcel Energy for a 345 kV Transmission Line from Brookings County, South Dakota to Hampton, Minnesota***  
**MPUC Docket No.: ET-2/TL-08-1474**  
**OAH Docket No.: 7-2500-20283-2**

Dear Judge Luis:

Great River Energy, a Minnesota cooperative corporation, and Northern States Power Company, a Minnesota corporation (“Xcel Energy”), (collectively, “the Applicants”) would like to take the opportunity to provide additional information regarding the Crossover Route and the Myrick Alignment Alternative. Applicants will also be providing further comments regarding other issues prior to the close of the record.

**Crossover Route**

As described in my supplemental testimony, if the Belle Plaine crossing of the Minnesota River were approved, Applicants support a hybrid route referred to as the Crossover Route. The Crossover Route follows the Applicants’ Modified Preferred Route from the Brookings Substation to the Cedar Mountain Substation. From the Cedar Mountain Substation, the route continues east along the Modified Preferred Route until it reaches what was referred to in my direct testimony as the “USFWS/MnDNR” crossover. The route then follows the “USFWS/MnDNR” crossover north to Applicants’ Alternate Route. The Crossover Route follows the Alternate Route east to the Helena Substation. At the Helena North Substation Area, the route returns to the Modified Preferred Route. The Crossover Route follows the Modified Preferred Route east from the Helena Substation to the Lake Marion Substation before reaching the Hampton Substation. A map of the Crossover Route was attached as Schedule 48b to my supplemental testimony.

The enclosed chart provides an analysis of potential impacts associated with the Crossover Route. This chart summarizes house impacts, agricultural impacts, wetland impacts, and other environmental impacts as well as providing information regarding route length and the amount of corridor sharing.

Hon. Richard Luis  
January 19, 2010  
Page 2

**Myrick Alignment**

In response to Mn/DOT's concerns in the Le Sueur area, Applicants identified one additional alignment, the Myrick Alignment, which was described in my supplemental testimony. As shown on Schedule 51 of my supplemental testimony, a portion of this alignment is outside Applicants' original route width for this area. This additional area extends approximately 400 feet southeast from the original route corridor and is approximately 1,000 feet in length.

The enclosed chart provides an analysis of potential impacts associated with the Myrick Alignment. This chart summarizes house impacts, agricultural impacts, wetland impacts, and other environmental impacts as well as providing information regarding route length and the amount of corridor sharing.

Sincerely,

s/ Craig Poorker  
Craig Poorker

Enclosures

cc: Karen Hammel  
Scott Ek  
Service List

Myrick Street Alignment Alternative

Section	Route Length (Miles)	Route (Acres) <sup>8</sup>	Right-of-Way (Acres) <sup>7</sup>	Corridor Sharing								Homes					
				Corridor Sharing - Road (Miles)	Corridor Sharing - Transmission (Miles)	Corridor Sharing - Railroad (Miles)	Corridor Sharing - Pipeline (Miles)	Corridor Sharing - Field Lines (Miles)	No Corridor Sharing (Miles) <sup>5</sup>	Total Corridor Sharing (Miles) <sup>4</sup>	Total Corridor Sharing (Percent)	0-75 ft from Route Centerline	75-150 ft from Route Centerline	150-300 ft from Route Centerline	300-500 ft from Route Centerline	0-500 ft from Route Centerline <sup>9</sup>	Number of Occupied Homes per mile
Myrick Street	2.4	287.1	43.1	0.7	0.0	0.0	0.0	0.6	1.1	1.2	52.7%	0	0	2	3	5	2.1

ASSUMPTIONS

- Number of poles was determined by dividing the length of each route section by the average span between poles. Average span for 345 kV poles is 1000ft. This number is approximate since the final number of poles is dependent on the final engineering design.
- Temporary impacts were determined using 1 acre per span. A span is defined as span plus a pole. Total temporary impacts were determined taking total number of poles minus one.
- Permanent impacts were calculated assuming 1,000 square feet (in agricultural land) and 55 square feet (in non-agricultural land) per structure.
- "Total Corridor Sharing" is the approximate amount of ROW that follows existing corridors such as transmission lines, roads, field lines and railroads.
- "No Corridor Sharing" is the approximate amount of ROW that does not follow existing corridors such as transmission lines, roads, field lines and railroads.
- The Applicants are requesting a 150 foot wide Right-of-Way (ROW); 75 ft on either side of pole. Additional ROW may be required in special situations.
- ROW acres were calculated based on a width of 150 feet multiplied by the length of the intended centerline.
- Route segments include areas up to 1.25 mile wide to accommodate placement. The Myrick Street Alignment Alternative falls within the Cedar Mountain South Substation Area to Helena South Substation Area Route section.
- Occupied homes were identified during field investigations and using 2006 and 2008 NAIP aerial photographs. The numbers were based upon adding individual segments from Substation to Substation. From the intended centerline, a 500 foot buffer flat buffer was applied to each segment. Distance were determined from the house point to Applicants intended centerline. Each house was assigned a range based up on the distance to centerline.

MYRICK STREET ALIGNMENT ALTERNATIVE

The Myrick Alternative, follows the north side of the U.S. Highway 169 corridor across the Minnesota River. Approximately 900 feet west of the State Highway 112 exit ramp the centerline heads southeast, crossing U.S. Highway 169. After crossing U.S. 169, the route turns slightly, crossing State Highway 112 and into Mayo Park in the City of Le Sueur. The route continues through Mayo Park, turning east at Forest Prairie Road (County Road 28) paralleling the north side of road, a distance of approximately 0.27 miles. The route then crosses Forest Prairie Road, turning in the southeast direction, crossing through a woodland bluff area and farm field line. The route then follows Myrick Street for 0.4 miles, where it heads directly east along a field line and narrow woodland, crossing an MCBS moderate biodiversity area, connecting with the Applicants' Modified Preferred route on 320th Street.

Myrick Street Alignment Alternative

Section	Right-of-Way (ROW) Acres <sup>1&amp; 2</sup>	Prime Farmland <sup>3</sup>								GAP Land Cover <sup>4</sup>															
		Prime Farmland within the ROW (Acres) <sup>3</sup>	Percent of the ROW that Crosses Prime Farmland	Prime Farmland if Drained within the ROW (acres)	Percent of ROW that Crosses Prime Farmland if Drained	Farmland of State Importance within the ROW (Acres)	Percent of ROW that Crosses Farmland of State Importance	ROW Prime Farmland, Prime Farmland if Drained, Farmland of Statewide Importance (Acres)	ROW Percent Prime Farmland, Prime Farmland if Drained, Farmland of Statewide Importance	ROW Aquatic Environments (Acres)	ROW Crop (Acres)	ROW Grassland (Acres)	ROW Lowland Deciduous Forest (Acres)	ROW Non-Vegetated (Acres)	ROW Shrubland (Acres)	ROW Upland Conifer Forest (Acres)	ROW Upland Deciduous Forest (Acres)	ROW Percent of Aquatic Environments	ROW Percent of Crop	ROW Percent of Grassland	ROW Percent of Lowland Deciduous Forest	ROW Percent of Non-Vegetated	ROW Percent of Shrubland	ROW Percent of Upland Conifer Forest	ROW Percent of Upland Deciduous Forest
Myrick Street	43.1	19.5	45.1%	9.8	22.7%	2.0	4.5%	31.2	72.4%	0.0	27.9	7.1	0.9	3.6	3.7	0.0	0.0	0.0%	64.7%	16.4%	2.0%	8.3%	8.5%	0.0%	0.0%

- Assumptions
1. The Applicants are requesting a 150 foot wide Right-of-Way (ROW); 75 ft on either side of pole. Additional ROW may be required in special situations.
  2. ROW acres were calculated based on a width of 150 feet multiplied by the length of the route centerline.
  3. Prime Farmland numbers were compiled using the USDA County Soil Survey Geographic (SSURGO) Data for all counties.
  4. Land cover numbers were compiled using the U.S. Geological Survey's Gap Analysis Program (GAP) Data .

**MYRICK STREET ALIGNMENT ALTERNATIVE**  
 The Myrick Alternative, follows the north side of the U.S. Highway 169 corridor across the Minnesota River. Approximately 900 feet west of the State Highway 112 exit ramp the centerline heads southeast, crossing U.S. Highway 169. After crossing U.S. 169, the route turns slightly, crossing State Highway 112 and into Mayo Park in the City of Le Sueur. The route continues through Mayo Park, turning east at Forest Prairie Road (County Road 28) paralleling the north side of road, a distance of approximately 0.27 miles. The route then crosses Forest Prairie Road, turning in the southeast direction, crossing through a woodland bluff area and farm field line. The route then follows Myrick Street for 0.4 miles, where it heads directly east along a field line and narrow woodland, crossing an MCBS moderate biodiversity area, connecting with the Applicants' Modified Preferred route on 320th Street.

Myrick Street Alignment Alternative

Section	Route Length (Miles)	Right-of-Way (ROW) Acres <sup>1&amp; 2</sup>	Wetlands										PWI and Shallow Lakes										
			Total wetlands within the ROW (Acres) <sup>3</sup>	Number of Wetlands Crossed	Percent of the ROW that Crosses Wetlands	Forested wetlands in ROW (Acres)	Number of Forested Wetlands Crossed	Percent of the ROW that Crosses Forested wetlands	Number of Wetlands Over 1000ft Crossed	Lengths (ft) of wetlands over 1000 ft that are crossed by ROW	Number of Poles in Wetlands <sup>5</sup>	Temporary Wetland Impacts (Acres)	Number of Streams and Rivers crossed by Intended Centerline <sup>4</sup>	Number of PWI Streams Crossed by Intended CL <sup>4</sup>	Number of PWI Lakes within Route (1000 ftwide) <sup>4</sup>	Number of PWI Wetlands within Route	Number of PWI Lakes within ROW	Number of PWI Wetlands within ROW	Number of PWI over 1000ft Crossed	Length (ft) of PWI over 1000ft that are crossed by the ROW	Number of Shallow Lakes within Route <sup>6</sup>	Number of Shallow Lakes within 1 mile (SF)	
Myrick Street	2.4	43.1	0.1	1	0.3%	0.0	0	0.0%	0	0	0	0.0	4	2	0	0	0	0	0	0	0	0	0

Assumptions

- The Applicants are requesting a 150 foot wide Right-of-Way (ROW); 75 ft on either side of pole. Additional ROW may be required in special situations.
- ROW acres were calculated based on a width of 150 feet multiplied by the length of the route centerline.
- Wetland numbers were compiled using the NWI maps and provide an estimate of the number of wetlands likely present along the route. These numbers do not necessarily represent the number of wetland impacts subject to state and federal wetland regulations.
- Streams crossing were compiled using MN DNR 24k streams. PWI streams were identified in the MN DNR dataset. PWI waters were identified using the MN DNR PWI maps.
- Number of poles was determined using the average span between poles, which was divided into the length of Wetland, or WMA span. Average span for a 345 kV poles is 1000ft. This number is conservatively rounded by the hundred foot digit.
- Route segments include areas up to 1.25 mile wide to accommodate placement. The Myrick Street Alignment Alternative falls within the Cedar Mountain South Substation Area to Helena South Substation Area Route section.

**MYRICK STREET ALIGNMENT ALTERNATIVE**  
 The Myrick Alternative, follows the north side of the U.S. Highway 169 corridor across the Minnesota River. Approximately 900 feet west of the State Highway 112 exit ramp the centerline heads southeast, crossing U.S. Highway 169. After crossing U.S. 169, the route turns slightly, crossing State Highway 112 and into Mayo Park in the City of Le Sueur. The route continues through Mayo Park, turning east at Forest Prairie Road (County Road 28) paralleling the north side of road, a distance of approximately 0.27 miles. The route then crosses Forest Prairie Road, turning in the southeast direction, crossing through a woodland bluff area and farm field line. The route then follows Myrick Street for 0.4 miles, where it heads directly east along a field line and narrow woodland, crossing an MCBS moderate biodiversity area, connecting with the Applicants' Modified Preferred route on 320th Street.

Myrick Street Alignment Alternative

Section	Route Length (Miles)	Right-of-Way (Acres) 1,2	Environmental															
			Number of MCBS Biodiversity sites crossed 8	Number of WMAs within 1 mile	Number of WMAs in Route <sup>6</sup>	Number of WMAs in ROW	WMA Temporary Impacts (Acres)	Lengths (ft) of WMA over 1000 ft that are crossed by ROW	Number of Poles in WMAs	Number of SNA within 1 mile	State Park within 1 mile <sup>6</sup>	Number of WPA within 1 mile <sup>9</sup>	USFWS Lands and Easements in Route	USFWS Lands and Easements within 1 mile	T & E Species within Route <sup>7</sup>	T & E Species within 1 Mile of Route	Number of Archaeological sites within 1 mile <sup>8</sup>	Number of Historical sites within 1 mile <sup>8</sup>
Myrick Street	2.4	43.1	1	0	0	0	0.0	0	0	0	0	0	0	0	0	10	5	3

Assumptions

1. The Applicants are requesting a 150 foot wide Right-of-Way (ROW); 75 ft on either side of pole. Additional ROW may be required in special situations.
2. ROW acres were calculated based on a width of 150 feet multiplied by the length of the route centerline.
3. Number of poles was determined using the average span between poles, which was divided into the length of Wetland, or WMA span. Average span for a 345 kV poles is 1000ft. This number is conservatively rounded by the hundred foot digit.
4. Scientific and Natural Areas, Wildlife Management Areas, State Parks, and Biodiversity Areas were acquired from the Minnesota DNR Data Deli
5. Rare and Threatened and Endangered species and Natural Communities were identified using data licensed from the MN DNR for this project.
6. Cultural resource data was obtained from the MN State Historic Preservation Office.
7. USFWS Lands and easements were obtained from the USFWS website in 2009.
8. Includes Medium, High, and Outstanding sites only. MCBS Biodiversity site information has only preliminary data for Lincoln County and Lyon County.
9. Route segments include areas up to 1.25 mile wide to accommodate placement. The Myrick Street Alignment Alternative falls within the Cedar Mountain South Substation Area to Helena South Substation Area Route section.

MYRICK STREET ALIGNMENT ALTERNATIVE

The Myrick Alternative, follows the north side of the U.S. Highway 169 corridor across the Minnesota River. Approximately 900 feet west of the State Highway 112 exit ramp the centerline heads southeast, crossing U.S. Highway 169. After crossing U.S. 169, the route turns slightly, crossing State Highway 112 and into Mayo Park in the City of Le Sueur. The route continues through Mayo Park, turning east at Forest Prairie Road (County Road 28) paralleling the north side of road, a distance of approximately 0.27 miles. The route then crosses Forest Prairie Road, turning in the southeast direction, crossing through a woodland bluff area and farm field line. The route then follows Myrick Street for 0.4 miles, where it heads directly east along a field line and narrow woodland, crossing an MCBS moderate biodiversity area, connecting with the Applicants' Modified Preferred route on 320th Street.



# **Attachment G**

CapX 2020 Brookings Route PUC Docket 08-1474

Supplemental Testimony of Craig Poorker (selected)

**STATE OF MINNESOTA**  
**OFFICE OF ADMINISTRATIVE HEARINGS**  
**FOR THE PUBLIC UTILITIES COMMISSION**

In the Matter of the Route Permit  
Application by Great River Energy and  
Xcel Energy For a 345 kV  
Transmission Line From Brookings  
County, South Dakota To Hampton,  
Minnesota

PUC Docket No. E002/TL-08-1474  
OAH Docket No. 7-2500-20283-2

SUPPLEMENTAL TESTIMONY OF

Craig Poorker

On Behalf of

APPLICANTS

GREAT RIVER ENERGY, A MINNESOTA COOPERATIVE CORPORATION,  
AND  
NORTHERN STATES POWER COMPANY, A MINNESOTA CORPORATION

December 14, 2009

Exhibit 140

1 desirable from the standpoint of aesthetic quality or when placement  
2 underground is not technically feasible, or is unreasonably costly.”

3  
4 In either case, Mn/DOT may permit the installations when the above conditions  
5 are met and the proposed installation will "be made at a location that will employ  
6 a suitable design and materials that give the greatest weight to the aesthetic  
7 qualities of the area being traversed ... and shall be of a design compatible with  
8 the scenic quality of the specific highway being traversed and shall blend in with  
9 the ground contours and the scenery wherever possible." Mn/DOT  
10 Accommodation Policy § V.G.3. - V.G.4.

11  
12 Based on Applicant’s review of Mn/DOT’s comment letter and further  
13 communications with Mn/DOT officials, it is Applicants’ understanding that  
14 Mn/DOT would not issue a permit for the proposed alignment of the Modified  
15 Preferred Route near or in the scenic easement areas near US 169 in Le Sueur  
16 and across the rest area in that location.

17  
18 **Q. HAVE APPLICANTS IDENTIFIED ANY OTHER ALIGNMENTS NEAR THE REST**  
19 **AREA THAT WOULD NOT POSE THE SAME MN/DOT PERMITTING ISSUES?**

20 A. Yes. Applicants requested a wide route in this area (approximately 4,700 feet) in  
21 light of anticipated routing challenges. In response to Mn/DOT’s concerns,  
22 Applicants have identified one additional alignment, the Myrick Alternative, as  
23 shown on **Schedule 51**.

1 The Myrick Alternative follows the north side of the US 169 corridor across the  
 2 Minnesota River. Approximately 900 feet west of the State Highway 112 exit  
 3 ramp the centerline heads southeast, crossing US 169. After crossing U.S. 169,  
 4 the route turns slightly, but remains in the southeast direction for 0.2 miles  
 5 (approximately 1,250 feet), crossing State Highway 112 and into Mayo Park in  
 6 the City of Le Sueur. The route continues through Mayo Park, turning east at  
 7 Forest Prairie Road (County Road 28) paralleling the north side of road, a  
 8 distance of approximately 0.27 miles (approximately 1,425 feet). The route then  
 9 crosses Forest Prairie Road, turning in the southeast direction for 1,250 feet,  
 10 crossing through a woodland bluff area and farm field line for approximately  
 11 4,300 feet. The route then follows Myrick Street for 0.4 miles (approximately  
 12 2,080 feet), where it heads directly east for 0.3 miles (approximately 1,900 feet)  
 13 along a field line and narrow woodland, crossing an MCBS moderate biodiversity  
 14 area, connecting with the Applicants' Modified Preferred route on 320th Street.

15  
 16 **Q. PLEASE DESCRIBE HOW THIS ALIGNMENT COMPARES TO THE PROPOSED**  
 17 **ALIGNMENT.**

18 A. Two key points of comparison between the two alignments are proximity to  
 19 homes and agricultural impacts. The tables below provide these comparisons.

20 **Proximity to Homes**

	75 - 150 ft	150 - 300 ft	300 - 500 ft	Total
<b>Modified Preferred Route</b>	0	3	0	3
<b>Myrick Street</b>	0	2	3	5

21

1

### Agriculture Impacts

	Cropland	Grassland	Total	
Modified Preferred Route	18.18	18.61	36.79	
Myrick Street Alternative	27.89	7.07	34.96	
	Prime farmland	Farmland of statewide importance	Prime farmland if drained	Total
Modified Preferred Route	15.26	1.88	5.43	22.57
Myrick Street Alternative	19.45	1.96	9.78	31.19

2

3 **Q. ARE APPLICANTS ADVOCATING FOR A SPECIFIC ALIGNMENT IN THIS AREA?**

4 A. No. Applicants request that if the Le Sueur crossing is approved, that a wide  
5 route be authorized in this area to work with Mn/DOT, USFWS, MnDNR and  
6 landowners to identify the alignment that best minimizes impacts in the area.

7

8 **Q. ARE THERE ANY OTHER MN/DOT SCENIC EASEMENTS IN THE PROJECT**  
9 **AREA?**

10 A. Yes. There is a parcel east of the Belle Plaine crossing. There are also several  
11 parcels along the Interstate 35 segment of the Alternate Route. Maps showing  
12 these areas are attached as **Schedules 52** and **53**.

13

14 **Q. DOES MN/DOT HAVE THE SAME PERMITTING CONCERNS ALONG THIS**  
15 **SCENIC AREA AS IT DOES IN THE LE SUEUR AREA?**

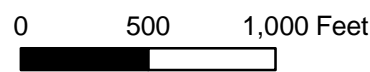
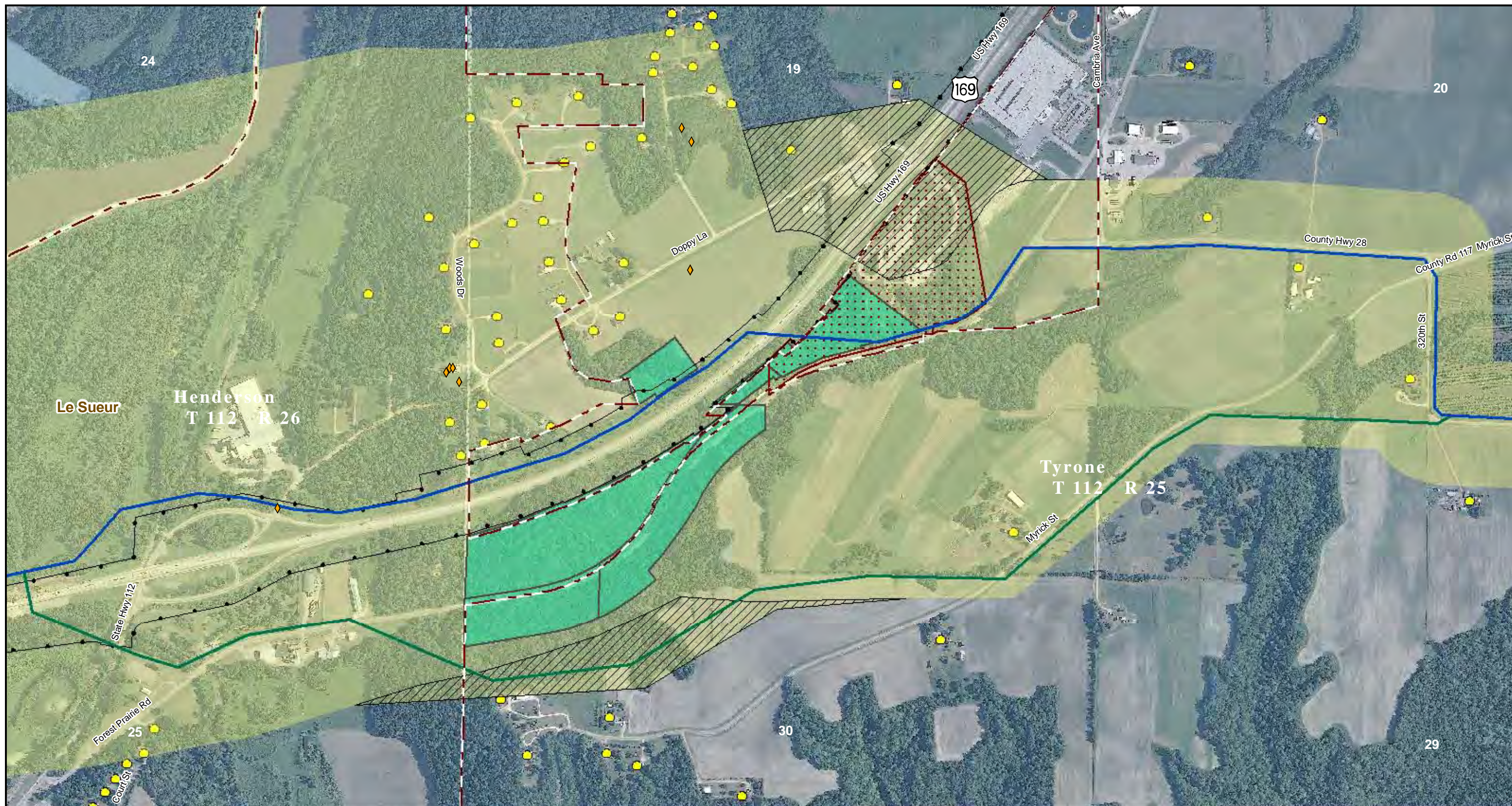
16 A. We understand that Mn/DOT does not have concerns about the scenic  
17 easement parcel near the Belle Plaine crossing because the proposed alignment  
18 would not cross the property. With respect to the scenic easement areas along

1 Interstate 35, Applicants understand that Mn/DOT is further analyzing the  
2 easements and will make a determination about what rules and regulations would  
3 apply to issuing a Utility Permit in that area.  
4

5 **III. CONCLUSION**  
6

7 **Q. DOES THIS CONCLUDE YOUR SUPPLEMENTAL TESTIMONY?**

8 A. Yes.  
9  
10  
11



- Modified Proposed Centerline
- Myrick St Route
- Modified Preferred Route
- Route Modification Post Route Permit Application
- Approximate Edge of MN DOT ROW
- MnDOT Rest Area
- Approximate MN DOT Scenic Easement Location
- City
- ◆ FCC Telecom Tower
- Residence

Map: Le Sueur Alternative Intended Centerline  
Le Sueur County, MN

Brookings County - Hampton  
345 kV Transmission Line